

Four New Species and Two First Records of the Eriophyid Mites in Egypt

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ABSTRACT

Six eriophyid mites, including four new species and two new records, from Egypt are described and illustrated. They are *Stenacis aegyptius* sp. nov., on *Cupressus sempervirens* L. (Cupressaceae); *Aceria donacis* Mohanasundaram, 1983, rec. n. on *Arundo donax* L. (Poaceae); *Aceria bambusae* Channabasavanna, 1966, rec. n. on *Bambusa vulgaris* Schrad. ex J.C. Wendl; *Schizaceae aegyptimperata* sp. nov. on *Imperata cylindrical* (L.) (Poaceae); *Epitrimerus abousettai* sp. nov. on *Cupressus sempervirens* L. (Cupressaceae) and *Abacarus donacis* sp. nov. on *Arundo donax* L. (Poaceae). The genus *Schizaceae* is recorded for the first time in Egyptian fauna. These species are vagrants on leaves without any damage except the forth species (*S. aegyptimperata*) which causes rust on inner surface of leaves of the host plant. A key to the species of *Schizaceae* of the world is provided.

Key words: Eriophyidae; Taxonomy; new species; *Aceria*; *Epitrimerus*; *Stenacis*; *Abacarus*; *Schizaceae*; Egypt.

INTRODUCTION

The superfamily Eriophyoidea is one of the major groups of obligatory herbivorous mites. Eriophyid mites are characterized by considerable host specificity.

So far, by this study, the total number of the Eriophyid mites of Egypt has been increased to 83 species belonging to 31 genera. Among them two species of the genus *Stenacis*; 31 species of the genus *Aceria* and four species of the genus *Epitrimerus* (Zaher, 1984; El-halawany, 2012; El-halawany *et al.*, 2014 and Elhalawany & Ueckermann, 2015).

The genus *Schizaceae* was established by Keifer, 1977 (Eriophyidae, Phyllocoptinae, Acaricalini) based on *Schizaceae gynerii* Keifer 1977, infesting *Gynerium sagittatum* (Poaceae). It is characterized by: Body fusiform; tarsal empodium divided; gnathosoma curved ventrad at an obtuse angle; prodorsal shield setae and tubercles missing; with frontal lobe overhanging gnathosoma. Leg I and II lacking basiventral femoral setae and Leg II lacking antaxial genual seta. Opisthosoma with dorsal annuli broader than ventral annuli and projecting evenly laterally; centrally, the dorsal annuli with broad furrow or trough. Opisthosoma ventral setae (*d*) and (*e*) missing (Amrine *et al.*, 2003). Up to now, the genus *Schizaceae* holds only three species: *Schizaceae gynerii* Keifer, 1977 on *Gynerium sagittatum* (Aubl.) Beauv. (Poaceae) from Colombia; *Schizaceae geonomae* Navia & Flechtmann, 2002 on *Geonoma* sp. (Arecaceae) from Brazi and *Schizaceae chinenseae* Huang and Wang, 2003 on *Polygonum chinese* L.(= *Persicaria chinensis* (L.)) (Polygonaceae) from china. Up to date, two species of eriophyid mites were recorded on *Imperata cylindrical* from Egypt

namely, *Aceria imperata* Zaher and Abou-Awad, 1978 and *Oziella niloticus* (Abou-Awad, 1981).

In a survey of the Eriophyidae associated with *Cupressus sempervirens*, *Imperata cylindrical*, *Arundo donax* and *Bambusa vulgaris* in Qalyubia and Sharkia governorates of Egypt, four new species and two first records were collected and described herein and a key to world species of the genus *Schizaceae* of the world is provided.

MATERIALS AND METHODS

Specimens were collected from November 2012 to March 2015. Specimens of the eriophyid mites were collected from plants by direct examination under a stereomicroscope. Slides were mounted with Keifer's F-medium (Amrine & Manson 1996). The mites were examined and drawn with a Carl Zeiss phase-contrast microscope equipped with a camera Lucida. The morphological terminology used herein follows that of Lindquist (1996) and the generic classification is based on Amrine *et al.* (2003). Specimens were measured following de Lillo *et al.* (2010). All measurements are given in micrometers (μm). Host plant names and their synonymies are in accordance with the plant list on-line database (2010). Holotype and some paratypes were deposited in the Collection of Department of Fruit Acarology, Plant Protection Research Institute, Agricultural Research Center, Egypt. Some paratypes were deposited as slides mounted specimens in Arthropod/Mite Collection of the Department of Entomology, Nanjing Agricultural University, Jiangsu Province, China. Two paratypes of the species are deposited at Collection of the Department of Zoology and Agricultural Nematology, Faculty of Agriculture, Cairo University, Egypt.

RESULTS AND DISCUSSION

Eriophyidae Nalepa, 1898

Subfamily Eriophyinae Nalepa, 1898

Tribe Eriophyini Nalepa, 1898

Genus *Stenacis* Keifer, 1970

Stenacis aegyptius Elhalawany, Wang & Xue (Figs. 1–2)

Description:

Female: (n = 10). Body vermiform, 170 (165–183) long, 42 (41–45) wide, 35 (35–37) thick; white colour. Gnathosoma 25 (24–25), projecting obliquely down, oral stylets 17 (17–18), pedipalp coxal seta (*ep*) 3 (3–4), dorsal pedipalp genual seta (*d*) 5 (4–5), chelicerae 25 (23–25). Prodorsal shield 25 (23–29) included frontal lobe, 27 (26–27) wide, subtriangular; frontal shield lobe sub-triangular 4 (4–6), divided; prodorsal shield with many granules. Scapular tubercles ahead of rear margin, 12 (12–13) apart, scapular seta (*sc*) 4 (4–5), projecting centrad. Coxigenital region with 6 (5–6) semiannuli. Coxal plates with granules, anterolateral setae on coxisternum I (*lb*) 7 (7–9), 11 (10–11) apart; proximal setae on coxisternum I (*la*) 17 (17–20), 7 (6–7) apart; proximal setae on coxisternum II (*2a*) 25 (22–27), 17 (17–18) apart. Prosternal apodeme 7 (6–7).

Leg I 22 (20–22), femur 7 (6–7), basiventral femoral seta (*bv*) 7 (7–8); genu 3 (3–4), antaxial genual seta (*l''*) 22 (20–22); tibia 6 (5–6), paraxial tibial seta (*l'*) 3 (3–4), located 1/3 from dorsal base; tarsus 4 (4–5), seta *ft'* 8 (8–9), seta *ft''* 18 (17–19), seta *u'* 2 (2–3); tarsal empodium (*em*) 5 (5–6), simple, 6-rayed, tarsal solenidion (*ω*) 7 (7–8), knobbed.

Leg II 20 (18–20), femur 6 (6–7), basiventral femoral seta (*bv*) 8 (7–8); genu 3 (3–4), antaxial genual seta (*l''*) 7 (6–7); tibia 5 (4–5); tarsus 4 (4–5), seta *ft'* 7 (7–8), seta *ft''* 17 (16–18), seta *u'* 2 (2–3); tarsal empodium (*em*) 5 (5–6), simple, 6-rayed, tarsal solenidion (*ω*) 7 (6–7), knobbed. Opisthosoma with 78 (76–83) dorsoventral annuli, with elongate microtubercles on rear annular margin, with 80 (78–83) microtuberculated ventral annuli. Seta *c2* 22 (20–23), 37 (36–38) apart, on ventral annulus 10 (9–11); seta *d* 23 (22–24), 14 (13–14) apart, on ventral annulus 22 (21–23); seta *e* 14 (13–14), 13 (12–14) apart, on ventral annulus 40 (39–41); seta *f* 18 (16–18), 16 (15–17) apart, on 5th ventral annulus from rear; seta *h1* 3 (2–3), seta *h2* 30 (27–35). Female genital coverflap 19 (19–20) wide, 13 (13–15), with 14 (13–14) longitudinal ridges, proximal setae on coxisternum III (*3a*) 11 (10–12), 12 (11–12) apart.

Male: (n = 4). Body fusiform, 155–167 long, 40–43 wide, 31–33 thick; white color. Prodorsal shield 19–21, 26–27 wide. Scapular tubercles ahead of rear

margin, 11–13 apart, scapular seta (*sc*) 3–4 projecting medially. Opisthosoma with microtuberculated annuli, the dorsal and ventral annuli number subequal, 69 (65–73). Male genitalia 15 (14–15) wide, 11 (11–12), proximal setae on coxisternum III (*3a*) 10 (9–11), 11 (10–12) apart.

Type material: Holotype, female (slide number NJAU Acari Eri Egypt 24.1; marked Holotype), from *C. sempervirens*, Qalyubia governorate, Egypt, 3 November 2012, 30°15'N, 31°13'E, coll. Ashraf El-Halawany, deposited as slide mounted specimens in the Arthropod/Mite Collection of the Department of Entomology, Nanjing Agricultural University, Jiangsu Province, China. Paratypes, 3 females and one male (slide numbers NJAU Acari Eri Egypt 24.2–24.5), with the same data as holotype; 10 females and 5 males (slide number EGPERio31.1–31.10) from *C. sempervirens*, Qalyubia governorate, Egypt, 3 November 2012, 30°15'N, 31°13'E, coll. Ashraf El-Halawany, deposited at the Department of Fruit Acarology, Plant Protection Research Institute, Dokki, Egypt; and two slides deposited at Department of Soil, Plant and Food Sciences (Di.S.S.P.A.), section of Entomology and Zoology, University of Bari Aldo Moro (Italy).

Type host plant: *Cupressus sempervirens* L. (Cupressaceae).

Relation to host: The mites are found vagrants on the tips of the twigs and squeezed into the crevices between the leaf scales.

Etymology: The species name *aegyptius*, refers to the Latin name of collected location Egypt.

Differential diagnosis: The new species is similar to *Stenacis thunbergii* She, Wang & Hong, 2009 by many coarse granules on the prodorsal shield and frontal shield lobe large but can be differentiated from the latter by reduced in size, female genital cover-flap with 14 longitudinal ridges (female genital coverflap smooth in *S. thunbergii*); coxae genital region with 6 semiannuli plus 3 transverse lines of granules at genital cover-flap base (coxae genital region with 4 semiannuli, cover-flap with many granules at base *S. thunbergii*) and empodium 6-rayed (empodium 5-rayed).

Tribe: Acerini Amrine & Stasny, 1994

Genus: *Aceria* Keifer, 1944

Aceria bambusae Channabasavanna, 1966 (Fig. 3)

Synonyms: *Aceria bambusae* Channabasavanna, 1966, 58–59, fig. 3–1.

Aceria havenensis (Keifer, 1979); Amrine & Stasny, 1994. 51, 493.

Eriophyes havenensis Keifer, 1979; Sukhareva, 1994. 147.

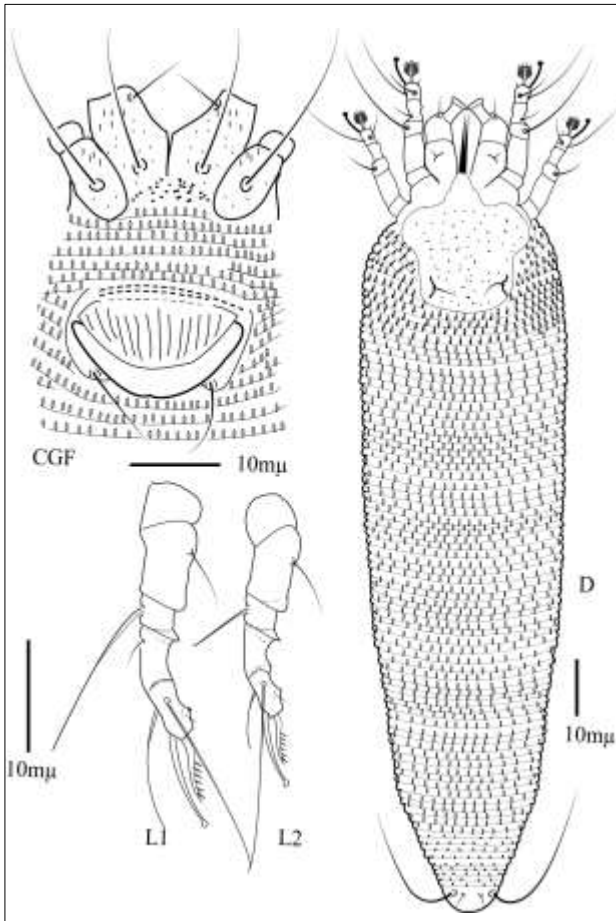


Fig. (1): *Stenacis aegyptius* n. sp.: D, dorsal view of mite; CGF, coxigenital region of female; L1, leg I; L2, leg II.

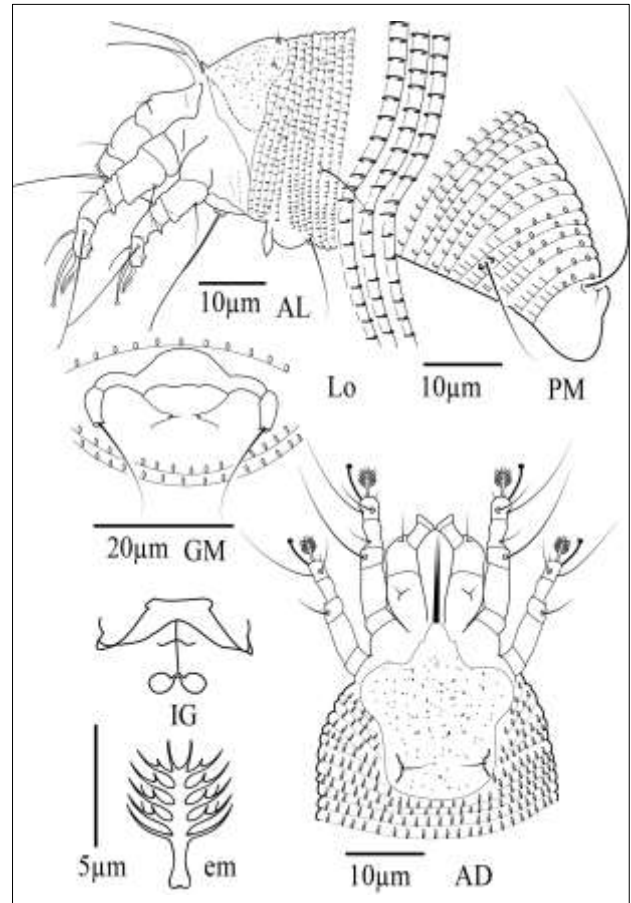


Fig. (2): *Stenacis aegyptius* n. sp.: AL, antero-lateral view of female; LO, lateral view of annuli; PM, posterior-lateral of opisthosoma; GM, male genitalia; IG, internal female genitalia; AD, antero-dorsal view; em, empodium.

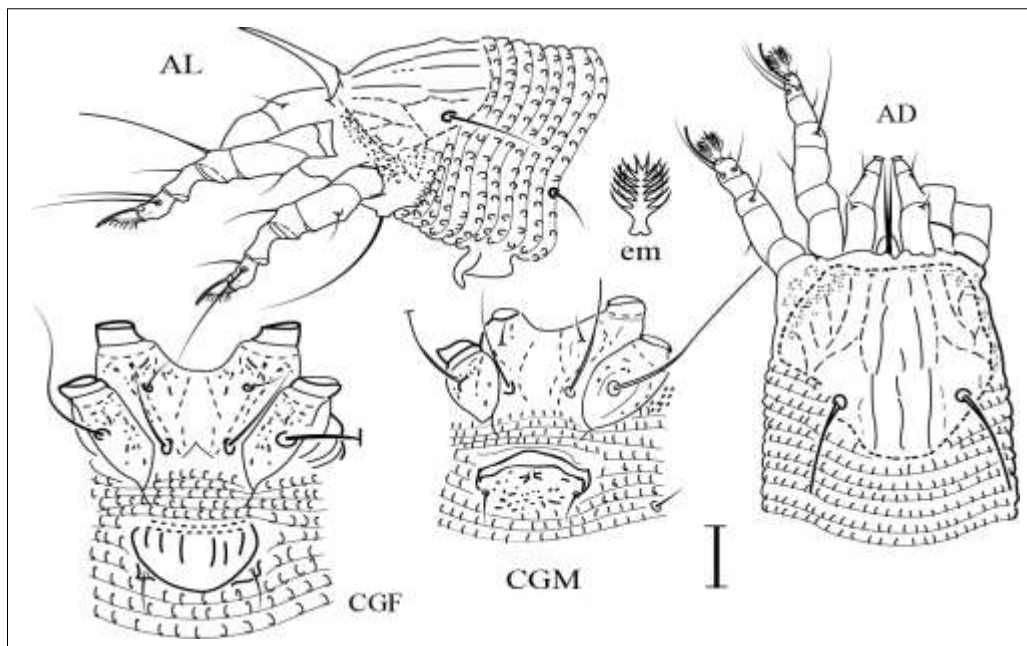


Fig.(3): *Aceria bambusae* Channabasavanna, 1966: AD- antero-dorsal shield; CGF- female coxae and genitalia; CGM- coxae genital male; em- empodium; AL- antero-lateral view of female; Scale bar- 10µm for AL, AD, CGF, CGM; 5µm for em.

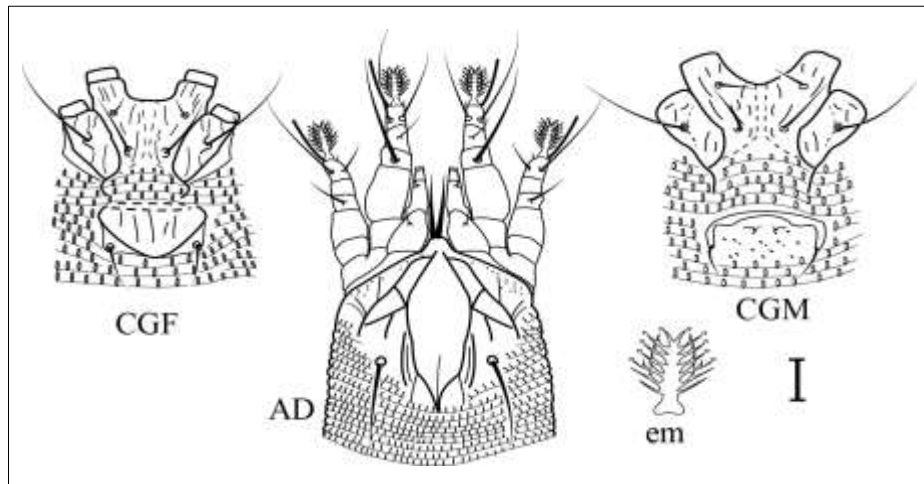


Fig.(4): *Aceria donacis* Mohanasandram, 1983: CGF– female coxae and genitalia; AD– anterio–dorsal shield; CGM– coxae genital male; em– empodium. Scale bar– 10 μ m for CGF, CGM AD; 5 μ m- for em.

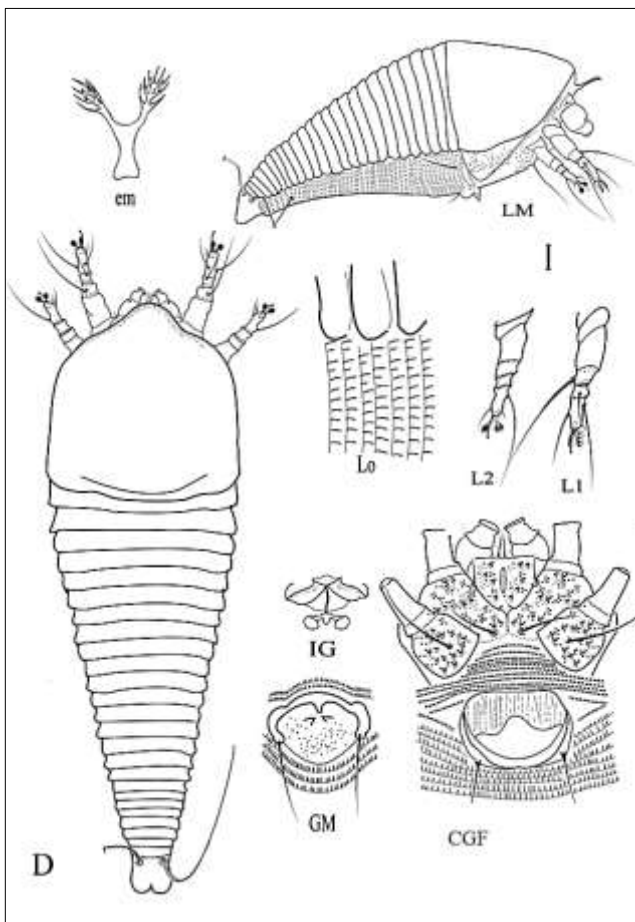


Fig.(5): *Schizaceae aegyptimperata* Elhalawany & Mesbah: LM– lateral view of female; CGF– coxigenital female region; L1, L2– Leg I, leg II; D– dorsal view of female; GM– male genitalia; em– empodium; IG– female internal genitalia; L0– microtubercles in lateral view. Scale bar– 10 μ m for D and IG; 5 μ m for CGF and L1, L2, GM; 2.5 μ m for em.

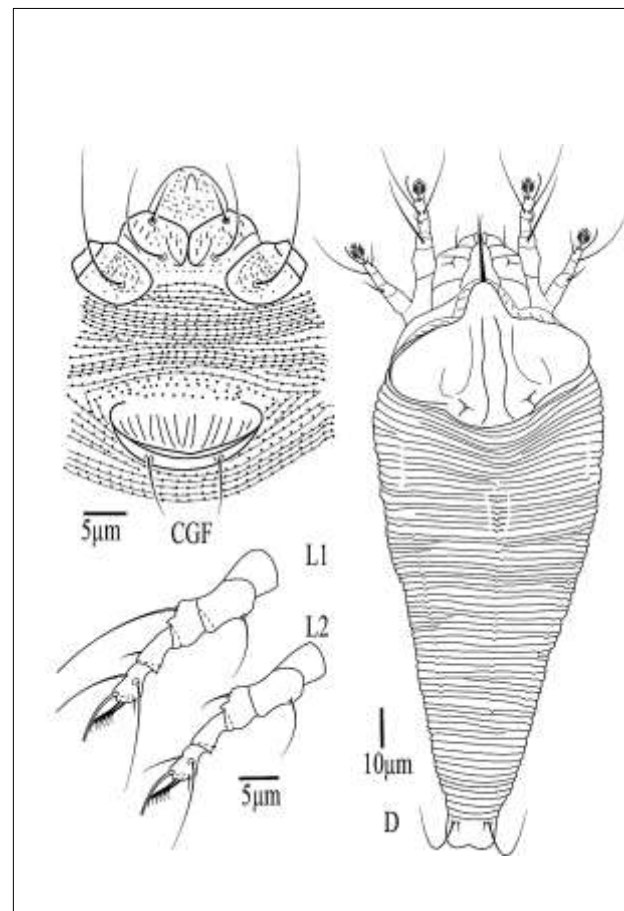


Fig.(6): *Eptrimerus abousettai* Elhalawany, Wang & Xue: D, dorsal view of mite; CGF, coxigenital region of female; L1, leg I; L2, leg II.

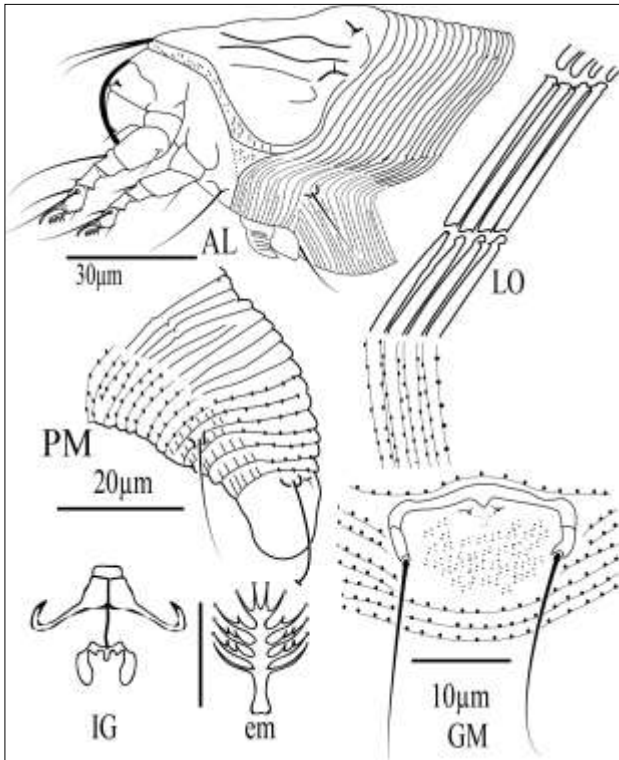


Fig.(7): *Epitrimerus abousettai* Elhalawany, Wang& Xue: AL, antero-lateral view of female; LO, lateral view of annuli; PM, posterior-lateral of opisthosoma; IG, internal female genitalia; em, empodium; GM, male genitalia.

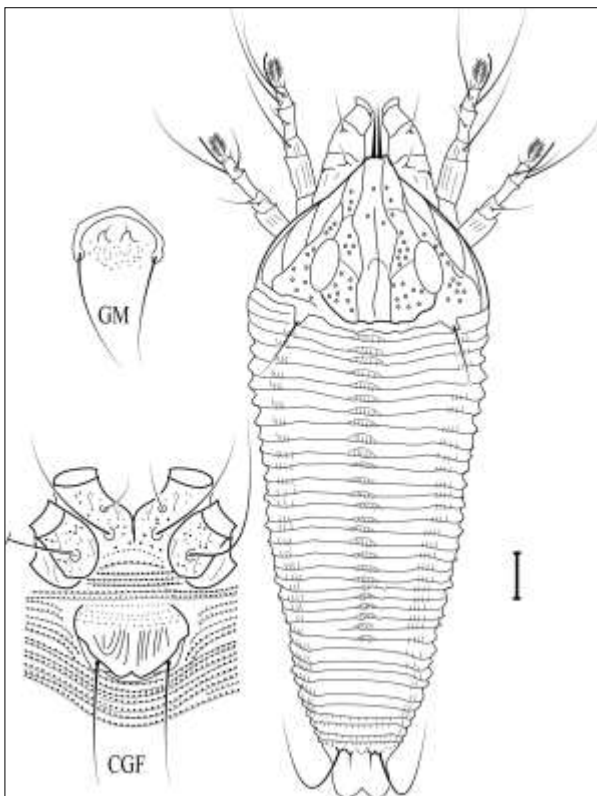


Fig. (8): *Abacarus donacis* Elhalawany: D- dorsal view of female; GM- male genitalia; CGF- female coxae and genitalia. Scale bar-10µm.

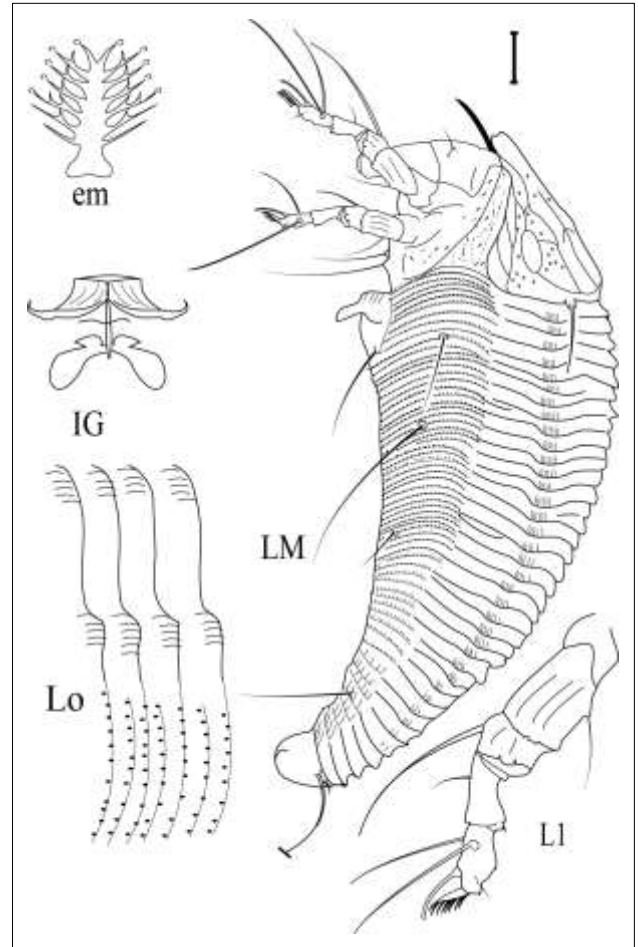


Fig.(9): *Abacarus donacis* Elhalawany: LM- lateral view of female; em- empodium; IG- female internal genitalia; Lo- microtubercles in lateral view; GM- male genitalia; L1- Leg I. Scale bar- 10µm for LM, IG; 5 µm for em and L1.

Abacarus bambusae (Channabasavanna, 1966); Huang 2001. 1, fig. 60.

Material examined: 20 females, 5 males and 4 nymph, (slide no. EGP-Erio51.1-51.20) Qalyubia governorate Egypt, (30°17'38.14"N, 31°14'51.56"E), from *Bambusa vulgaris* Schrad. ex J.C. Wendl (Poaceae), coll. A. Elhalawany, 10 October 2014.

Relation to the host plant: This mite vagrant under inner surface of the leaves sheath around stem.

Geographic distribution: India, (Florida) USA, China, Russia.

Remarks: This is the first record of *A. bambusae* from Egypt. The morphometry of the female was described by Channabasavanna, 1966. The morphometric data for the female largely match the original description by Channabasavanna, 1966. However, the lengths of the opisthosomal setae *d* (33–40), and number of Opisthosoma annulus (57–62) of the Egyptian specimens are slightly shorter than those in Channabasavanna's description, also absent internal coxisternal apodeme a line, possibly resulting from differences in the quality of the microscope used.

Aceria donacis Mohanasandram, 1983 (Fig. 4)

Material examined: 10 females, 5 males and 3 nymphs, (slide no. EGP-Erio52.1-52.15) Qalyubia governorate Egypt, (30°15'13.04"N, 31°10'10.42"E), from *Arundo donax* L. (Poaceae), coll. A. Elhalawany, 15 October 2014.

Relation to the host plant: This mite vagrant under inner surface of leaves sheathes around the stem.

Geographic distribution: India.

Remarks: This is the first record of *A. donacis* from Egypt. This species was named by Mohanasandram, 1983, based only on female specimens collected from India. The morphometric data for the female largely matches the original description by Mohanasandram, 1983. On the other hand, the lengths of the opisthosomal setae *C2* (22–35), seta *e* (14–17), seta *f* (18–20) of the Egyptian specimens are slightly longer than those in Mohanasandram's description. In addition, number of opisthosoma annulus differenced dorsally (69–72) and ventrally (53–57) annulus.

Subfamily Phyllocoptinae Nalepa, 1892.

Tribe Acaricalini Amrine & Stasny, 1994.

Genus Schizacea Keifer, 1977. C13: 1-2.

Schizacea aegyptimperata Elhalawany & Mesbah (Fig. 5)

Description:

Female: (n = 10). Body fusiform, 160 (154–165) long, 60 (55–62) wide, 57 (57–62) thick; amber color.

Gnathosoma 16 (15–17), curved ventrad at an obtuse angle, pedipalp coxal setae (*ep*) 3 (3–4), dorsal pedipalp genual setae (*d*) 2 long, chelicerae 11 (10–11).

Prodorsal shield 50 (48–53) long including frontal lobe, 50 (50–55) wide; sub-semicircular in anterior outline, with rounded and broad based frontal lobe 7 (7–9) over gnathosomal base; prodorsal shield unornamented, with transverse curved line at base of prodorsal shield.

Scapular tubercles and scapular setae missing. Coxal plates with granules; setae (*Ib*) 8 (7–8), 12 (11–13) apart; setae (*Ia*) 15 (14–16), 5 (5–6) apart; setae (*2a*) 23 (22–25), 22 (21–23) apart. Prosternal apodeme 5 (5–6) forked anterior.

Leg I: 26 (25–27); femur 8 (7–8), basiventral femoral setae (*bv*) absent; genu 4 (3–4), antaxial genual setae (*l'*) 26 (22–26); tibia 4 (3–4), paraxial tibial setae (*l'*) 8 (7–8), located 3/4 from dorsal base, tarsus 6 (5–6), paraxial, fastigial, tarsal setae (*ft'*) 10 (8–11), antaxial, fastigial, tarsal setae (*ft''*) 22 (20–23), setae (*u'*) 4 (3–4); tparsal empodium (*em*) 5 (5–6), divided, 4-rayed in each branch, tarsal solenidion (*ω*) 6 (6–7) distally slightly knobbed.

Leg II: 23 (22–24), femur 7 (7–8), setae (*bv*) absent; genu 3 (3–4), setae (*l''*) absent; tibia 3 (3), tarsus 6 (5–7), setae (*ft'*) 8 (6–8), (*ft''*) 22 (20–23), setae (*u'*) 4 (3–4); tarsal empodium (*em*) 5 (5–6), divided, 4-rayed in each branch, tarsal solenidion (*ω*) 6 (6–7) distally slightly knobbed.

Opisthosoma: Dorsally with 25 (24–25) broad, with 53 (50–56) narrow ventral semiannuli (counted from the first annulus after the coxae II), coxigenital region with 10 (8–10) semiannuli between coxa and genital cover-flap with spiny microtubercles set on posterior part of ventral semiannuli. Dorsal semiannuli with a dorso-median longitudinal furrow from 2-3 dorsal semiannuli ending near 6-7th annulus of body from end; slightly elongate microtubercles set on posterior part of ventral semiannuli; setae *c2* 30 (27–32), 43 (42–44) apart, on ventral semiannulus 7 (6–7); setae *d* and setae *e* absent; setae *f* 20 (18–23), 20 (20–21) apart, on 6th ventral semiannulus from rear; setae *h1* absent; setae *h2* 50 (47–53), 9 (9-10) apart. Female genital cover-flap 19 (17–20) long, 22 (20–23) wide, anterior region with elongate granules, proximal setae on coxisternum III (*3a*) 13 (12–15), 15 (15–16) apart.

Male: (n = 3). Similar to female, body fusiform, 159 (140–160) long, 45 (45–50) wide, 57 (47–50) thick. **Gnathosoma** 15 (14–15), pedipalp coxal setae (*ep*) 4 (3–4), dorsal pedipalp genual setae (*d*) minute, chelicerae 10 (10–11).

Prodorsal shield: 45 (44–46) long including frontal

lobe 6 (6–7), 46 (44–47) wide. Coxal plates with granules; setae (*Ib*) 6 (6–7), 10 (10–11) apart; setae (*Ia*) 17 (15–18), 4 (4–5) apart; setae (*2a*) 20 (19–20), 18 (18–20) apart. Internal coxisternal apodeme a line 5 (4–5) forked anterior.

Leg I: 24 (22–24); femur 7 (7–8), basiventral femoral setae (*bv*) absent; genu 4 (3–4), antaxial genual setae (*l'*) 24 (22–24); tibia 3 (3–4), paraxial tibial setae (*l'*) 8 (7–8), located 3/4 from dorsal base, tarsus 6 (5–6), paraxial, fastigial, tarsal setae (*ft'*) 8 (8–10), antaxial, fastigial, tarsal setae (*ft''*) 21 (20–22), setae (*u*) 4 (3–4); tarsal empodium (*em*) 5 (5–6), divided, 4-rayed in each branch, tarsal solenidion (ω) 6 (6–7) distally slightly knobbed.

Leg II: 22 (22–23), femur 6 (6–7), setae (*bv*) absent; genu 3 (3–4), setae (*l''*) absent; tibia 3, tarsus 6 (5–7), setae (*ft'*) 8 (6–8), (*ft''*) 22 (20–23), setae (*u*) 4 (3–4); tarsal empodium (*em*) 5 (5–6), divided, 4-rayed in each branch, tarsal solenidion (ω) 6 (6–7) distally slightly knobbed.

Opisthosoma: Dorsally with 24 (22–24) broad, with 45 (42–50) narrow ventral semiannuli (counted from the first annulus after the coxae II), coxigenital region with 8 (8–9) semiannuli between coxa and genital cover-flap with spiny microtubercles set on posterior part of ventral semiannuli. Dorsal semiannuli with a dorso-median longitudinal furrow from 2-3 dorsal semiannuli ending near 6th annulus of body from end; slightly elongate microtubercles set on posterior part of ventral semiannuli; Setae *c2* 25 (25–27), 36 (35–38) apart, on ventral semiannulus 5 (4–5); setae *d* and setae *e* absent; setae *f* 20 (18–23), 20 (20–21) apart, on 5-6th ventral semiannulus from rear; setae *hl* absent; setae *h2* 42 (40–45). Genitalia 12 (12–13) long, 15 (15–17) wide, granulated, proximal setae on coxisternum III (*3a*) 20 (15–21), 12 (11–12) apart.

Host plant: *Imperata cylindrical* (L.) (Poaceae).

Relation to the host plant: The mites cause rust on inner surface of leaves of the host plant.

Type Locality: Qalyubia Egypt, 30°15'14.41"N, 31°16'53.97"E, 12 November 2014, Coll. Ashraf El-Halawany, and Sharkia governorate, Egypt, 10 January 2015. Coll. Amira Mesbah

Type material: Holotype, single female on a microscope slide (slide no. EGP-Erio54.1), deposited at Fruit Acarology Department Collection, Plant Protection Research Institute (PPRI), Dokki, Egypt.

Paratypes: 10 females and 5 males on 10 separate microscope slides.

Etymology: This specific name "*imperata*" is derived from the name of the host plant on which the new species was collected, and "*aegypt*" derived from

locality Egypt.

Differential diagnosis: The new species is the fourth species in the genus *Schizaceae*. The new species herein described was compared with all *Schizaceae* species and no complete similarities along with any of the other three species were observed. Few similarities were observed with *Schizaceae gynerii* Keifer, 1977 on *Gynerium sagittatum* (Aubl.) Beauv. (Poaceae) from Colombia in shape of genitalia, but differs from *S. gynerii* in the prodorsal shield pattern, frontal lobe, empodium rayed and microtubercles ventrally. Also differs from *Schizaceae chinenseae* Huang & Wang, 2003 on *Persicaria chinensis* (L.) (Polygonaceae) from China in prodorsal shield design; genital coverflap with 13 longitudinal ridges in *S. chinenseae*. (prodorsal shield smooth and genitalia with elongate dashes in *S. aegyptimperata*).

Key to the world species of *Schizaceae* Keifer

1. Opisthosoma with dorso-median longitudinal ridges, genital cover-flap with elongate granules 2
 - Opisthosoma with dorso-median longitudinal furrow, genital cover-flap with elongate granules or longitudinal ridges 3
2. Empodium 5-rayed, microtubercles spiny ventrally and fine elongate dorsally *S. gynerii* Keifer, 1977
 - Empodium 7-8-rayed, microtubercles slightly elongate ventrally and absent dorsally *S. geonomae* Navia & Flechtmann, 2002.
3. Prodorsal shield with complete admedian line, genital cover-flap with 13 longitudinal ridges *S. chinenseae* Huang & Wang, 2003.
 - Prodorsal shield without admedian line, genital coverflap with elongate granules *S. aegyptimperata* Elhalawany & Mesbah

Tribe Phyllocoptini Nalepa, 1892

Genus *Epitrimerus* Nalepa, 1898

Epitrimerus abousettai sp. nov. (Figs. 6–7)

Description:

Female: (n = 10). Body fusiform, 180 (175–195) long, 72 (62–74) wide, 50 (48–52) thick; amber colour. Gnathosoma 30 (28–30), projecting obliquely down, oral stylets 21 (21–22); pedipalp coxal seta (*ep*) 3 (3–4), dorsal pedipalp genual seta (*d*) 6 (5–6). Prodorsal shield 51 (49–51) included frontal lobe, 70 (64–72) wide; sub triangular; frontal shield lobe broad 15 (14–15); with lateral lobes; median line absent, complete admedian lines present and concaved at basal 1/4 and 2/3; faint submedian lines ahead of scapular tubercles, scapular tubercles ahead of rear shield margin, 22 (21–22) apart, scapular setae (*sc*) 3 (3–4) projecting centrad. Coxigenital region

with 17 (16–18) semiannuli between coxae and genitalia. Coxal plates with short lines and granules, anterolateral setae on coxisternum I (*Ib*) 11 (11–13), 13 (13–14) apart; proximal setae on coxisternum I (*Ia*) 20 (19–23), 10 (9–10) apart; proximal setae on coxisternum II (*2a*) 24 (22–24), 27 (25–30) apart; sternal line short. Leg I 30 (30–32), femur 12 (10–12), basiventral femoral seta (*bv*) 10 (10–11); genu 5 (5–6), antaxial genual seta (*l'*) 24 (22–24); tibia 7 (7–8), paraxial tibial seta (*l'*) 3 (3–4), located 2/3 from dorsal base; tarsus 7 (6–7), seta *ft'* 21 (19–21), seta *ft''* 25 (23–25), seta *u'* 3 (3–4); tarsal empodium (*em*) 8 (8–9), simple, 6-rayed, tarsal solenidion (*ω*) 8 (8–9), tapering. Leg II 28 (26–28), femur 10 (9–10), basiventral femoral seta (*bv*) 11 (10–11); genu 5 (4–5), antaxial genual seta (*l'*) 5 (5–6); tibia 6 (5–6); tarsus 6 (6–7), seta *ft'* 7 (7–8), seta *ft''* 23 (21–23), seta *u'* 3 (3–4); tarsal empodium (*em*) 8.5 (8–9), simple, 6-rayed, tarsal solenidion (*ω*) 8 (8–9), tapering. Opisthosoma with 64(64–67) smooth dorsal annuli, 87(86–88) microtuberculated ventral annuli, middorsal ridge and lateral ridges stretching over 47–50 dorsal annuli. Seta *c2* 20 (19–20), 54 (53–60) apart, on ventral annulus 17 (17–18); seta *d* 25 (22–28), 37 (33–38) apart, on ventral annulus 37 (37–38); seta *e* 16 (16–19), 18 (17–19) apart, on ventral annulus 62 (62–63); seta *f* 16 (16–18), 17 (17–18) apart, on 5th ventral annulus from rear; seta *h1* 3 (2–3), seta *h2* 25 (25–32). Female genitalia cover-flap 35 (32–36) wide, 18 (18–20) long, with 14 longitudinal ridges and granules at base, proximal setae on coxisternum III (*3a*) 14 (13–15), 16 (15–17) apart.

Male: (n = 6). Body fusiform, 140–170, 57–61 wide, 45–48 thick. Prodorsal shield 39–41 included frontal lobe, 50–53 wide; sub triangular; frontal lobe broad 13–14; scapular tubercles ahead of rear margin, 17–19 apart, scapular setae (*sc*) 2–3 projecting centered. Opisthosoma with 52–56 smooth dorsal annuli and 72–75 microtuberculated ventral annuli, middorsal ridge and lateral ridges stretching over 40–43 dorsal annuli. Male genitalia 19–22 wide, 12–15, proximal setae on coxisternum III (*3a*) 13–16, 14–16 apart.

Type material: Holotype, female (slide number NJAUAacariEriEgypt25.1; marked Holotype), from *C. sempervirens*, Qalyubia governorate, Egypt, 3 November 2012, 30°15'N, 31°13'E, coll. Ashraf Elhalawany, deposited as slide mounted specimens in the Arthropod/Mite Collection of the Department of Entomology, Nanjing Agricultural University, Jiangsu Province, China. Paratypes, 6 females and 2 males on 4 slides (slide numbers NJAUAacariEriEgypt25.2–25.5), from *C. sempervirens*, Qalyubia governorate, Egypt, 3 November 2012, 30°15'N, 31°13'E, coll. Ashraf

El-Halawany, deposited as slide mounted specimens in the Arthropod/Mite Collection of the Department of Entomology, Nanjing Agricultural University, Jiangsu Province, China; 10 females and 5 males (slide numbers EGPERio30.1–30.10) from *C. sempervirens*, Qalyubia governorate, Egypt, 3 November 2012, 30°15'N, 31°13'E, coll. Ashraf El-Halawany, deposited at Department of Fruit Acarology, Plant Protection Research Institute, Dokki, Egypt; 10 females and 5 males (slide numbers EGPERio30.11–30.20) from *C. sempervirens*, Qalyubia Governorate, Egypt, 15 March 2014, 30°15'N, 31°13'E, coll. Ashraf El-Halawany, deposited at Department of Fruit Acarology, Plant Protection Research Institute, Dokki, Egypt; and two slides deposited at Department of Soil, Plant and Food Sciences (Di.S.S.P.A.), section of Entomology and Zoology, University of Bari Aldo Moro (Italy).

Type host plant: *Cupressus sempervirens* L. (Cupressaceae).

Relation to host: Vagrant on tips of the twigs and squeezed into the crevices between the leaf scales; no apparent damage was observed.

Etymology: This species was named after the Emeritus Prof. Dr. Mahmed M. Abou-setta, Plant Protection Research Institute, A.R.C., Egypt.

Differential diagnosis: The new species *Epitrimerus abousettai* sp. nov. is similar to *Epitrimerus cupressi* (Keifer, 1939) in empodium 6-rayed, but can be differentiated from the latter by dorsal annuli smooth; prodorsal shield with complete admedian lines present and faint submedian ahead of scapular tubercles (dorsal annuli with microtubercles; admedian lines present from central to anterior and absent submedian line in *E. cupressi*). Also the new species resemble to *E. macnabianae* Keifer, 1969 in prodorsal shield design and empodium 6-rayed but differs by dorsal annuli smooth and genital cover-flap with 14 longitudinal ribs, while in *E. macnabianae* dorsal annuli with microtubercles and genital cover-flap with curved transverse lines. Moreover the new species similar to *E. phoeniceae* Keifer, 1962 in dorsal annuli smooth but differs in design of prodorsal shield complete admedian line, empodium 6-rayed, genital female cover-flap with 14 longitudinal ribs, anterior coxae contiguous, raised of ventral annuli more than 87, coxae genital region with 17 semiannuli, setae *c2* and *d* shorter about 20 and 25 μ, respectively in *E. abousettai*, in versus prodorsal shield design obsolete, anterior coxae not definitely contiguous, empodium 5-rayed, genital female cover-flap with 12 diagonal furrows, ventral annuli less about 65, coxae genital region with 9 semiannuli, setae *c2* and *d* longer about 32 and 42 μ in *E. phoeniceae*.

Tribe Anthocoptini Amrine & Stasny, 1994.**Genus *Abacarus* Keifer, 1944. ES XIV, BCDA 33(1): 28.*****Abacarus donacis* Elhalawany (Figs. 8 & 9)****Description:**

Female: (n = 7). Body fusiform, 165 (160–173) including gnathosoma, 50 (48–59) wide, 58 (57–62) long; thick; white–yellowish colour. **Gnathosoma** 25 (22–26), projecting obliquely downwards, pedipalp coxal setae (*ep*) 4 (3–4), dorsal pedipalp genual setae (*d*) 6 (5–6), chelicerae 17 (17–19).

Prodorsal shield 35 (32–37) including frontal lobe, 42 (40–44) wide; subtriangular in anterior shape with a broad base and distally frontal lobe with four projections anterior–medially 8 (7–9) over gnathosomal base; prodorsal shield ornamented, with median, admedian and two submedian lines; median, admedian and first submedian lines connecting to each other at posterior end; median line present at 3/4 from base of shield, lateral sides of prodorsal shield with short lines; two elliptical shape cells connected with submedian lines at the 1/3 base of the prodorsal shield; prodorsal shield with granules between admedian and submedian lines and laterally; admedian and submedian lines connected at 1/3 and 2/3 from rear shield with short line, laterally with lines forming cells above coxae. Scapular tubercles on rear shield margin, 35 (34–37) apart, scapular setae (*sc*) 14 (12–15) projecting backward reaching 5th dorsal annulus. Coxal plates with granules and dashes; setae (*Ib*) 6 (5–6), 9 (8–10) apart; setae (*Ia*) 18 (16–18), 8 (7–8) apart; setae (*2a*) 23 (21–24), 19 (17–19) apart. Prosternal apodeme 6 (5–6).

Leg I: 30 (30–32); femur 9 (8–9), basiventral femoral setae (*bv*) 9 (8–11); genu 5 (4–5), antaxial genual setae (*l'*) 21 (20–24) femur and genu with short lines; tibia 7 (6–7), paraxial tibial setae (*l'*) 5 (4–5), located 1/3 from dorsal base, tarsus 5 (4–5), paraxial, fastigial, tarsal setae (*ft'*) 11 (11–13), antaxial, fastigial, tarsal setae (*ft''*) 17 (17–19), setae (*u'*) 4 (3–4); tarsal empodium (*em*) 6 (5–6), simple, 7–rayed, tarsal solenidion (*ω*) 7 (6–7) distally tapered.

Leg II: 27 (25–28), femur 8 (8–9), setae (*bv*) 12 (10–14); genu 4 (4–5), setae (*l''*) 10 (9–11) femur and genu with short lines; tibia 5 (5–6), tarsus 5 (5–6), setae (*ft'*) 8 (8–10), (*ft''*) 16 (14–16), setae (*u'*) 4 (3–4); tarsal empodium (*em*) 6 (6–7), simple, 7–rayed, tarsal solenidion (*ω*) 7 (7–8) distally tapered.

Opisthosoma: Dorsally with 35 (34–36), with 60 (59–62) narrow ventral semiannuli (counted from the first annulus after the coxae II), coxigenital region with 7 (6–7) semiannuli between coxa and genital cover-flap with pointed microtubercles set on posterior part of ventral semiannuli. Dorsal

semiannuli with three longitudinal wax ridges, the middle dorsal wax ridges ending about near 10 annulus from end of body, followed by dorsal furrow ending near 4th annulus of body from end; lateral ridges joining caudally fading on 3rd or 4th last opisthosomal annuli; microtubercles on dorsal annuli elongate only on ridges and on 4th from rear, present only on ridges; bead–like microtubercles set on posterior part of ventral semiannuli; last 8–10 ventral semiannuli with elongated and liner microtubercles; setae *c2* 25 (22–27), 43 (41–46) apart, on ventral semiannulus 10 (10–11); setae *d* 28 (26–30), 28 (27–30) apart, on ventral semiannulus 22 (22–23); setae *e* 10 (8–11), 16 (15–18) apart, on ventral semiannulus 39 (37–40); setae *f* 20 (19–23), 20 (19–21) apart, on 5th ventral semiannulus from rear; setae *h1* 3 (3–4), 5 (4–5) apart, setae *h2* 30 (25–32). Female genitalia cover-flap 15 (14–17) long, 21 (20–22) wide, with 12 longitudinal ridges, with four transverse line granules at base, proximal setae on coxisternum III (*3a*) 20 (19–22), 14 (14–15) apart.

Male: (n = 4). Similar to female, body fusiform, 160 (160–165) including gnathosoma, 46 (45–48) wide, 44 (44–46) thick; white–yellowish color.

Gnathosoma 22 (22–23), projecting obliquely downwards, pedipalp coxal setae (*ep*) 4 (3–4), dorsal pedipalp genual setae (*d*) 6 (5–6), chelicerae 14 (13–14).

Prodorsal shield: 33 (32–34) including frontal lobe 8 (7–8), 38 (37–40) wide; Scapular tubercles on rear shield margin, 33 (33–34) apart, scapular setae (*sc*) 14 (13–15) projecting backward. Coxal plates with granules and dashes; setae (*Ib*) 7 (6–7), 10 (8–10) apart; setae (*Ia*) 18 (16–18), 7 (7–8) apart; setae (*2a*) 20 (18–20), 19 (18–19) apart. Internal coxisternal apodeme a line 6 (5–6).

Leg I: 24 (23–24); femur 9 (8–9), basiventral femoral setae (*bv*) 10 (9–10); genu 4, antaxial genual setae (*l'*) 17 (16–18) femur and genu with short lines; tibia 6 (5–6), paraxial tibial setae (*l'*) 4 (4–5), located 1/3 from dorsal base, tarsus 4, paraxial, fastigial, tarsal setae (*ft'*) 10 (9–11), antaxial, fastigial, tarsal setae (*ft''*) 15 (13–16), setae (*u'*) 3 (3–4); tarsal empodium (*em*) 5 (5–6), simple, 6–rayed, tarsal solenidion (*ω*) 6 (no range available) tapered.

Leg II: 22 (22–23), femur 7 (7–8), setae (*bv*) 12 (10–13); genu 4 (4–5), setae (*l''*) 8 (8–10) femur and genu with short lines; tibia 5 (5–6), tarsus 4, setae (*ft'*) 6 (no range available), (*ft''*) 15 (14–16), setae (*u'*) 3 (3–4); tarsal empodium (*em*) 5 (6–7), simple, 6–rayed, tarsal solenidion (*ω*) 6 (6–7) tapered.

Opisthosoma: Dorsally with 32 (31–33), with 54 (52–55) narrow ventral semiannuli (counted from the

first annulus after the coxae II). Coxigenital region with 6 (6–7) semiannuli between coxa and genital coverflap with pointed microtubercles set on posterior part of ventral semiannuli. Dorsal semiannuli with three longitudinal wax ridges; setae *c2* 20 (19–21), 33 (33–34) apart, on ventral semiannulus 8; setae *d* 28 (28–30), 21 (21–23) apart, on ventral semiannulus 21; setae *e* 12 (10–14), 12 (12–14) apart, on ventral semiannulus 37; setae *f* 18 (16–18), 12 apart, on 5th ventral semiannulus from rear; setae *h1* 4 (4–5), setae *h2* 32 μ . Genitalia 12 (11–13) long, 16 (15–16) wide, seta (*3a*) 22 (19–24), 14 (13–14) apart.

Host plant: *Arundo donax* L. (Poaceae).

Relation to the host plant: The mites are vagrants under inner surface of the leaves sheath around stem without any damage observed.

Type Locality: Qalyubia Egypt, 30°15'13.04"N, 31°10'10.42"E, 2 October 2014, Coll. Ashraf Elhalawany.

Type material: Holotype, single female on a microscope slide (slide no. EGP–Erio53.1), deposited at Fruit Acarology Department Collection, Plant Protection Research Institute (PPRI), Dokki, Egypt.

Paratypes: 10 females and 5 males on 10 separate microscope slide.

Etymology: This specific name "*donacis*" is derived from the name of the host plant on which the new species was collected.

Differential diagnosis: This new species similar to *Abacarus afer* Keifer, 1962 described from *Coffea arabica* L. (Rubiaceae) in design of prodorsal shield and number of opisthosomal annulus, but differs in having 7–rayed tarsal empodium, tarsal solenidion unknobbed, genital coverflap with 12 longitudinal ribs and four transverse granules lines at base; the opisthosomal annuli with wax ridges, longer seta *Sc* 14 μ long and *C2* 25 μ long of *A. donacis* sp. nov.; while tarsal empodium 5–rayed, tarsal solenidion slight knobbed, genital cover-flap ridges with 10 longitudinal ribs and fine longitudinal lines at base, shorter seta *Sc* 8.5 μ long and *C2* 10 μ long of *A. afer*. Moreover, this new species is similar to *Abacarus arunis* Wen, Gai & Zhi, 2004 from on *Arundo donax* in 7–rayed tarsal empodium and number of dorsal annuli, however, prodorsal shield design with broken median line at 1/2 and without granules and cells; dented slightly frontal lobe; smaller *Sc* 4.5 μ long; seta *f* at 8th from rear of *A. arunis*, in versus, prodorsal shield ornamented with granules and cells median line complete; four projections of anterior frontal lobe; *Sc* 14 μ long; seta *f* at 5th from rear in *A. donacis* sp. nov.

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