



A new genus and two new species of grass feeding phyllocoptine mites (Acari: Eriophyoidea) from West Bengal, India

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ABSTRACT

One new genus *Subductophyes* gen. nov. and two new species of eriophyoid mites viz. *Subductophyes digitariae* sp. nov. infesting *Digitaria ciliaris* (Retz.) Koeler (Poaceae) and *Mesalox mutica* sp. nov. infesting *Apluda mutica* L. (Poaceae) are described in the tribe Phyllocoptini and Anthocoptini (Eriophyidae: Phyllocoptinae) respectively, from West Bengal, India. Relationship of the new genus and species with other related eriophyoid taxa are discussed.

Key words: Acari, Eriophyoidea, *Subductophyes digitariae*, *Mesalox mutica*, West Bengal, India.

INTRODUCTION

A project of the Ministry of Environment, Forest and Climate Change, Government of India has been undertaken to explore the diversity of eriophyoid in West Bengal and North eastern States of India. Accordingly surveys were conducted at regular intervals keeping in mind the different categories of plants in that area. During 2016 emphasis was given on the eriophyoids infesting different species of the grass family Poaceae. Following that programme some specimens were collected from *Digitaria ciliaris* (Retz.) Koeler and *Apluda mutica* L. in Howrah and Hooghly districts of West Bengal along with some other specimens. Two new species viz., *Subductophyes digitariae* sp. nov. infesting *Digitaria ciliaris* and *Mesalox mutica* sp. nov. infesting *Apluda mutica* thus collected, are described here. A new genus, *Subductophyes* gen. nov. is erected to accommodate *Subductophyes digitariae* sp. nov. A Key for separating species of *Mesalox* is given.

MATERIALS AND METHODS

Eriophyoid mites were collected and studied as described by Chakrabarti et al. (2017). The

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terminology and classification given by Lindquist (1996) and Amrine et al. (2003) respectively are followed here. The specimens were examined with a phase contrast microscope Leica DM3000 and photographs were taken with Leica DFC295 camera. All measurements were made following Amrine & Manson (1996) and de Lillo et al. (2010) and are given in micrometres (μm). Measurements and means are rounded off to the nearest integer when required. Drawings were made following de Lillo et al. (2010) and Amrine et al. (2003). In the text, measurements of holotype are followed by the range of measurements of the paratypes given in the parentheses. All type specimens are now deposited in the collection of the Post-Graduate Department of Zoology, Vidyasagar College, Kolkata- 700006, India. After publication, the holotype along with a few paratypes will be deposited in the National Zoological Collection, Zoological Survey of India, Kolkata and some paratypes in the National Pusa Collection, Indian Agricultural Research Institute, New Delhi.

RESULTS

Family **Eriophyidae** Nalepa, 1898

Subfamily **Phyllocoptinae** Nalepa, 1892

Tribe **Phyllocoptini** Nalepa, 1892

Subductophyes gen. nov.

Zoobank: LSID urn. Isid:zoobank.org:act: 5851271D-84AB-4EBA-9A3F-E7B18DB8B8F3

Diagnosis. Body fusiform. Prodorsal shield subtriangular with large frontal lobe without broad-based rib and longitudinal cuticular thickenings. Opisthosoma typically divided into broad and stout dorsal annuli and narrow, microtuberculated ventral annuli. Scapular setae *sc* situated ahead of rear shield margin and directed centrad to each other. Subtriangular dorsal ‘flap’ absent on prodorsal shield. All usual setae present except basiventral femoral seta *bv* on leg I missing. Genitalia sunken.

Type species. *Subductophyes digitariae* sp. nov.

Species included. *Subductophyes digitariae* sp. nov.

Etymology. The generic name is derived from the Latin word ‘*ductus*’ (m. noun) means ‘lining’ with pronoun ‘*Sub*’ means ‘below’ in relation to sunken genitalia of this eriophyoid species (Latin ‘*phyes*’= grower or maker). The genus name is masculine.

DISCUSSION

Among the Phyllocoptini genera having no basiventral femoral seta *bv* on leg I *Subductophyes* gen. nov. comes very close to *Arectus* Manson, 1984, *Athrix* Fleethmann, 2004 and *Costolobus* Chetverikov & Craemer, 2017 (in Chetverikov et al., 2017). However, this new genus differs from *Arectus* by absence of subtriangular dorsal ‘flap’ on dorsal shield and presence of pedipalp tarsal setae *v*, from *Athrix* in having paraxial tibial setae *l'* on leg I and normal pedipalp genual setae *d*, and from *Costolobus* by absence of large, broad-based ribbed frontal lobe with eight longitudinal cuticular thickenings and ridges on dorsal annuli.

Subductophyes digitariae sp. nov.

(Figs. 1-9)

Zoobank: LSID urn. Isid:zoobank.org:act: 46437B71-1190-413D-8AFF-O626C9A278CE

Diagnosis. Dorsal pedipalp genual setae *d* and pedipalp tarsal setae *v* present. Scapular setae *sc* situated ahead of rear shield margin, directed centrad to each other. Prodorsal shield without median line and admedian lines absent from anterior 0.3 part of shield, almost touched at posterior shield margin, on anterior 0.5 part curved and wide apart. All usual setae present except basiventral femoral seta *bv* on leg I missing. Dorsal annuli of opisthosoma with elongate

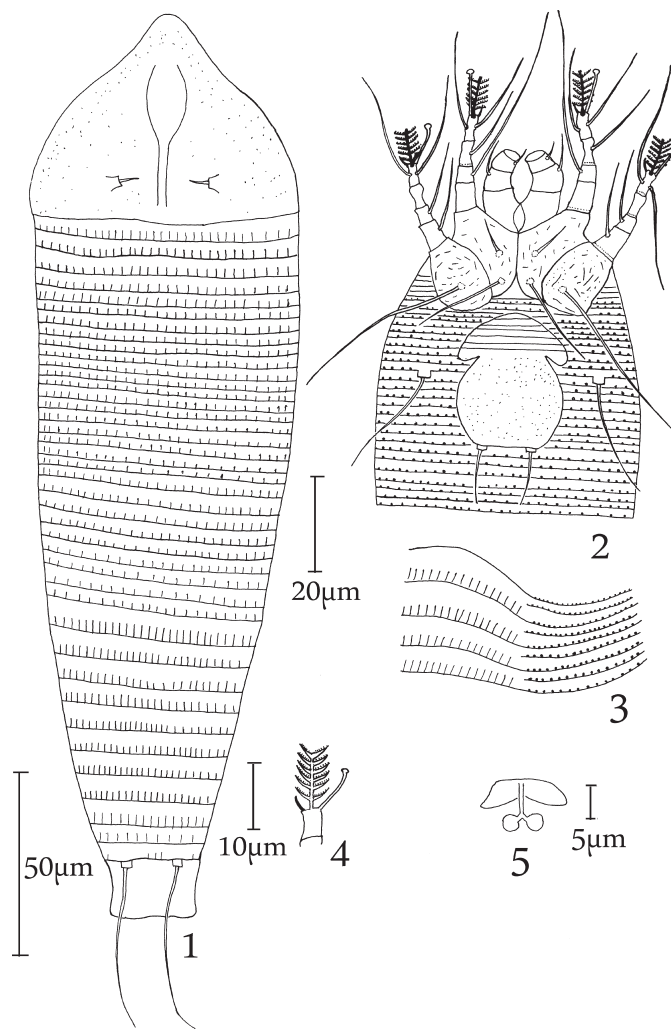


Fig. 1-5. FEMALE: *Subductophyes digitariae* gen. nov. et sp. nov. 1. Dorsal view of the body 2. Coxal-genital region 3. Dorsal and ventral annuli 4. Empodium 5. Internal genitalia.

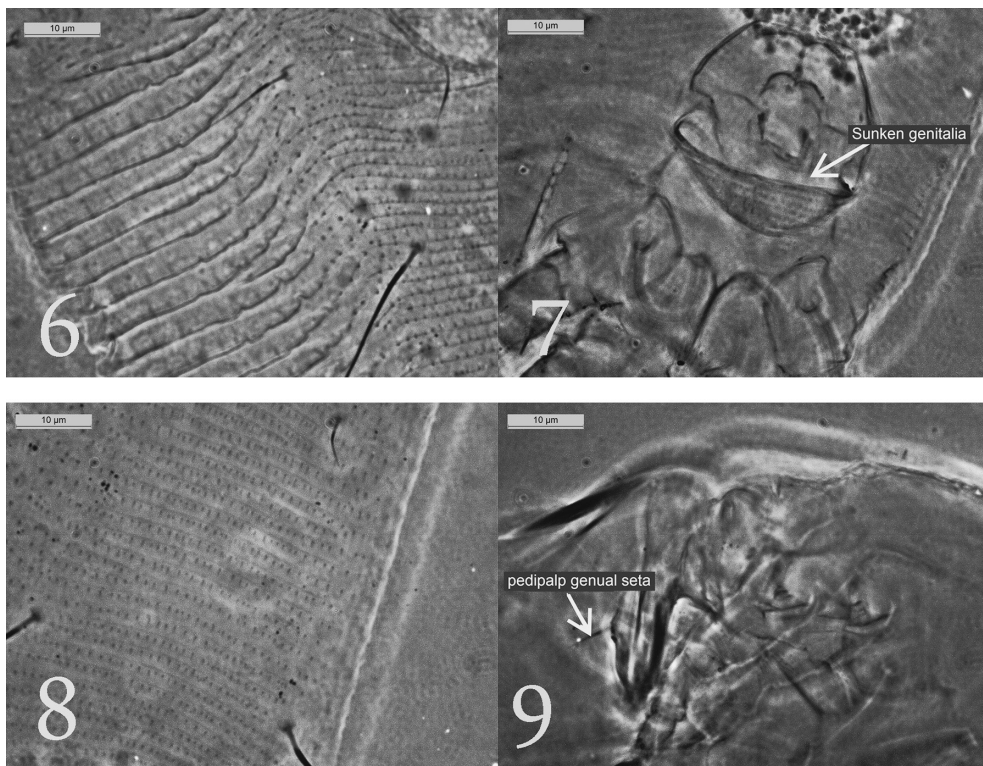


Fig. 6-9. FEMALE: *Subductophyes digitariae* gen. nov. et sp. nov. 6. Lateral view showing long microtuberculated dorsal annuli 7. genitalia 8. Microstriations on ventral annuli 9. Pedipalp genual setae *d*.

microtubercles. Empodium simple and 6-rayed.

FEMALE (n=15). Body fusiform, 200 (185-200) long, 62 (60-62) wide, brown coloured. Gnathosoma: 45 (44-45) long, almost straight; dorsal pedipalp genual setae *d* 5 (4-5) long, pedipalp tarsal setae *v* 3 (2-3) long. Prodorsal shield: 49 (48-49) long, 55 (55-56) wide, subtriangular with large frontal lobe present, median line absent, admedian lines absent from anterior 0.3 part of shield, almost touched at posterior shield margin, on anterior 0.5 part curved and wide apart, no sign of submedian lines, few small scattered granules present throughout the shield; prodorsal tubercles 2 (2-3) long, situated ahead of rear shield margin, scapular setae *sc* 3 (2-3) long, directed centrad to each other. Sternal line complete. Coxae I: 13 (13-14) long, with few small dashes, anterolateral setae on coxisternum I *lb* 6 (6-7) long, 5 (5-6) apart; proximal setae on coxisternum I *la* 10 (10-11) long, 6 (6-7) apart; setae *lb* located well ahead of setae *la*. Coxae II: 11 (11-12) long, with few elongated lines, proximal setae on coxisternum II *2a* 30 (30-31) long and 10 (10-11) apart, setae *la* located almost in same line with *2a*. Leg I: 43 (41-43) long, femur 10 (9-10) long, basiventral femoral setae *bv* absent; genu 5 (5-6) long, antiaxial genual setae *l''* 31 (31-32) long; tibia 8 (7-8) long, paraxial tibial setae *l'* 9 (8-9) long; tarsus 6 (6-7) long, paraxial fastigial tarsal setae *ft'* 15 (14-15) long, antiaxial fastigial tarsal setae *ft''* 12 (12-7)

13) long, paraxial unguinal tarsal setae $u' 3$ (2-3) long; tarsal empodium em entire, 5 (5-6) long, 6-rayed, tarsal solenidion ω 6 (6-7) long, knobbed terminally and little curved. Leg II: 35 (34-35) long, femur 10 (9-10) long, basiventral femoral setae bv 9 (9-10) long; genu 5 (4-5) long, antaxial genual setae l'' 11 (11-12) long; tibia 8 (7-8) long, paraxial tibial setae l' absent; tarsus 6 (5-6) long, paraxial fastigial tarsal setae ft' and antaxial fastigial tarsal setae ft'' both 14 (13-14) long, paraxial unguinal tarsal setae $u' 2$ (2-3) long; tarsal empodium em entire, 5 (5-6) long, 6-rayed, tarsal solenidion ω 6 (5-6) long, knobbed terminally and little curved. Opisthosoma: with 40 (40-41) dorsal annuli bearing elongate microtubercles and 65 (64-65) ventral annuli with rounded microtubercles placed anteriorly to each sternal margin till 30th annuli, last 35 annuli bears microstriations; 4-5 ventral annuli present between coxae II and genital coverflap; setae $c2$ 12 (11-12) long on 13th ventral annulus; setae d 53 (52-53) long on 25th ventral annulus; setae e 6 (6-7) long on 40th ventral annulus; setae f 20 (19-20) long on 61st ventral annulus; setae $h1$ absent, setae $h2$ 42 (41-42) long. Genitalia sunken, genital coverflap 27 (26-27) long, 25 (24-25) wide, arranged in 4-5 transverse lines, proximal setae on coxisternum III $3a$ 7 (7-8) long. Internal genitalia: apodeme slightly curved and abbreviated.

MALE. Not observed.

Etymology. The specific name is derived from the genitive case of *Digitaria*, the genus name of the host plant.

Type material. Female holotype on slide #1834/168/2016; 23 female paratypes and 4 nymphs on slides labeled #1835-1845/168/2016.

Host plant and locality. Collected from *Digitaria ciliaris* (Retz.) Koeler (Poaceae), Acharya Jagadish Chandra Bose Indian Botanic Garden, near Griffith Avenue, Howrah, India, 22°33'23.9" N, 88°18'02.7" E, 31m above sea level, 26 October, 2016, collected by S. Sur.

Relation to host. The mites are undersurface leaf vagrants and produce no apparent damage symptom.

Tribe **Anthocoptini** Amrine & Stasny, 1994

Mesalox mutica sp. nov.

(Figs. 10-19)

Zoobank: LSID urn. Isid:zoobank.org:act: 9EB7B07F-A44A-43B6-A172-FCEE7AA0D789

Diagnosis. Median line on prodorsal shield separated anteriorly and posteriorly. Surfaces of both coxae ornamented with several curved lines along with granules. Empodium 7- rayed.

FEMALE (n=15). Body fusiform, 154 (154-156) long, 52 (48-52) wide; light yellow in colour. Gnathosoma: 37 (36-38) long, straight; dorsal pedipalp genual setae d 7 long. Prodorsal shield: 40 (40-42) long, 49 (48-51) wide, frontal lobe distinct, median line touching almost posterior end of shield but discontinuous, separated anteriorly and posteriorly on shield, admedian lines complete and not sinuate; submedian lines single on each outside of prodorsal tubercles, incomplete; prodorsal tubercles 3 (3-4) long and 25 (24-27) apart, scapular setae sc 12 (11-14) long and directed posteriorly. Sternal line complete. Coxae I: 15 (14-16) long, well sculptured with several curved lines along with granules, anterolateral setae on coxisternum I lb 6 (6-7) long, 10 (10-11) apart, proximal setae on coxisternum I la 15 (15-17) long, 8 (8-9) apart; setae lb located well ahead of setae la and situated below anterior coxal approximation. Coxae II: 12 (12-14) long, with curved lines, proximal setae on coxisternum II $2a$ 22 (21-23) long and 19 (19-

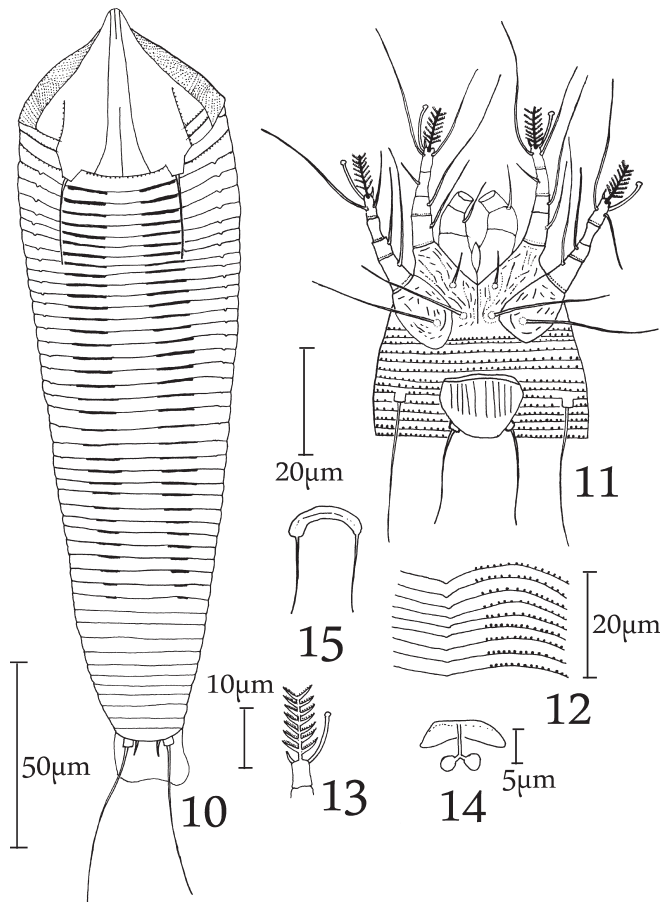


Fig. 10-15. FEMALE: *Mesalox mutica* sp. nov. 10. Dorsal view of the body 11. Coxal-genital region 12. Dorsal and ventral annuli 13. Empodium 14. Internal genitalia. MALE: 15. Genitalia.

20) apart, where setae *1a* located little ahead of line between *2a*. Leg I: 33 (31-34) long, femur 8 (8-9) long, basiventral femoral setae *bv* 10 (10-12) long; genu 5 (5-6) long, antaxial genual setae *l''* 21 (21-23) long; tibia 7 (7-8) long, paraxial tibial setae *l'* 4 (4-6) long; tarsus 6 (6-8) long, paraxial fastigial tarsal setae *ft'* 19 (19-20) long, antaxial fastigial tarsal setae *ft''* 14 (14-16) long, paraxial unguinal tarsal setae *u'* 2 (2-3) long; tarsal empodium em entire, 6 (6-7), 7-rayed, tarsal solenidion ω 9 (9-10) long, knobbed terminally and little curved. Leg II: 30 (30-32) long, femur 8 (8-9) long, basiventral femoral setae *bv* 16 (16-17) long; genu 4 (4-6) long, antaxial genual setae *l''* 13 (13-15) long; tibia 5 (5-7) long, paraxial tibial setae absent; tarsus 5 (5-6) long, paraxial fastigial tarsal setae *ft'* 20 (20-22) long, antaxial fastigial tarsal setae *ft''* 7 (7-8) long, paraxial unguinal tarsal setae *u'* 2 (2-3) long; tarsal empodium em entire, 6 (6-7) long, 7-rayed, tarsal solenidion ω 9 (9-10) long, knobbed terminally and little curved. Opisthosoma: Dorsal annuli 51 (50-51) with three rows of spinules, one median furrow flanked by two broad parallel

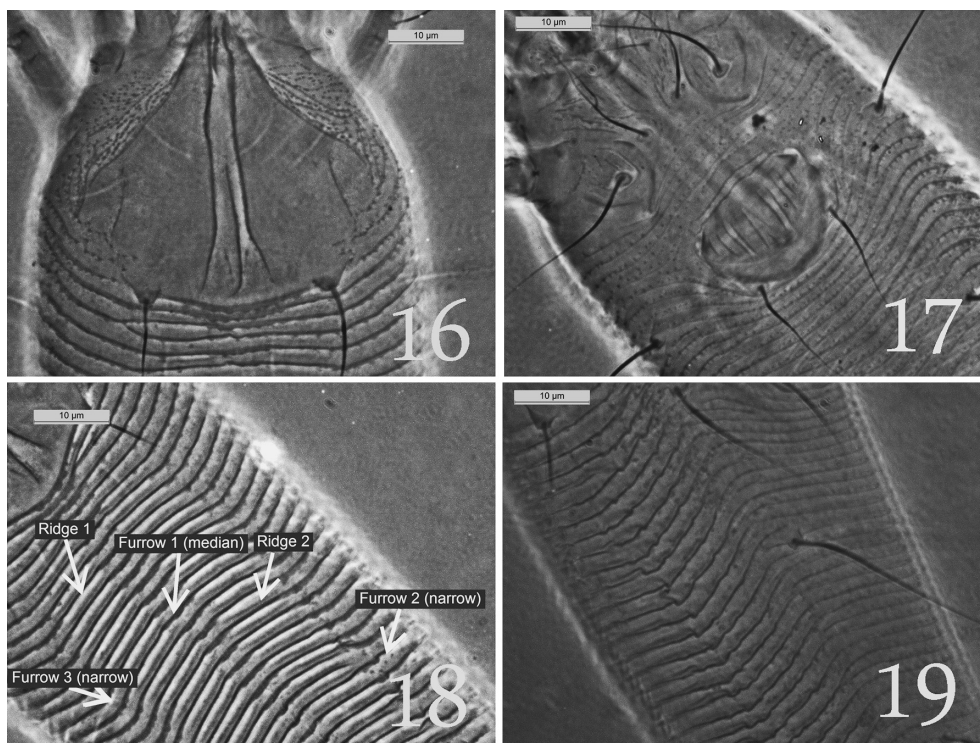


Fig. 16-19. FEMALE: *Mesalox mutica* sp. nov. 16. Prodorsal shield 17. Coxal-genital region 18. Median furrow along with ridges and narrow lateral furrows 19. Dorsal and ventral annuli in lateral view.

ridges up to 36th annuli, two indistinct very narrow furrows present laterally up to 24th annuli; ventral annuli 70 (70-71), each annulus with small elongated beads on anterior margin, with small microstiations on last 15 annuli; setae *c2* 25 (24-25) long on 10th ventral annulus; setae *d* 35 (34-35) long on 25th ventral annulus; setae *e* 11 (11-12) long on 43rd ventral annulus; setae *f* 31 (30-31) long on 64th ventral annulus; setae *h1* 3 (3-4) long, setae *h2* 30 (30-34) long. Genital coverflap: 11 (11-13) long, 18 (18-20) wide, with 10 (10-11) long longitudinal scorings originating from anterior margin of flap, proximal setae on coxisternum III *3a* 15 (14-17) long. Internal genitalia: apodeme slightly curved and abbreviated.

MALE (n=1). Smaller than female, 140 long, 40 wide; prodorsal shield: 34 long, 39 wide, scapular seta *sc* 8 long. Leg I: 28 long, femur 6 long, basiventral femoral setae *bv* 7 long; genu 4 long, antaxial genual setae *l''* 12 long; tibia 5 long, paraxial tibial setae *l'* 5 long; tarsus 6 long, paraxial fastigial tarsal setae *fi'* 19 long, antaxial fastigial tarsal setae *fi''* 14 long, paraxial unguinal tarsal setae *u'* 2 long; tarsal empodium entire, 6 long, 7-rayed, tarsal solenidion ω 9 long, knobbed terminally. Leg II: 23 long, femur 6 long, basiventral femoral setae *bv* 8 long; genu 3 long, antaxial genual setae *l''* 9 long; tibia 4 long, paraxial tibial setae *l'* absent; tarsus 4 long, paraxial fastigial tarsal setae *fi'* 20 long, antaxial fastigial tarsal setae *fi''* 7 long, paraxial

unguinal tarsal setae u' 2 long; tarsal empodium em entire, 6 long, 7-rayed, tarsal solenidion ω 9 long, knobbed terminally. Coxae: $1b$ 3 long; $1a$ 11 long, $2a$ 18 long. Genitalia: 15 wide, $3a$ 10 long; seta $h1$ 3 long, seta $h2$ 25 long.

Etymology. The specific name is derived from the epithet of the host plant and feminine gender.

Type material. Female holotype along with 3 female and 1 male paratypes on slide #1846/116/2016; 15 female paratypes and 5 nymphs on slides labelled #1847-1852/116/2016.

Host plant and locality. Collected from *Apluda mutica* L. (Poaceae), Serampore (near Serampore College), Hooghly, India, 22° 45'N, 88° 21' E, 79m above sea level, 10 September, 2016, collected by S. Sur.

Relation to host. The mites are undersurface leaf vagrants and produce no apparent damage symptom.

Discussion. At present, 8 species of *Mesalox* Keifer, 1962 are known. *Mesalox mutica* **sp. nov.** distinctly differs from these species in having 7-rayed empodium and discontinuous median line that almost touching posterior end of prodorsal shield. Besides these species that can be separated by the characters are provided in the following key.

Key to the species of *Mesalox* Keifer, 1962

1. Empodium 7-rayed, median line present anteriorly and posteriorly; on *Apluda mutica* L *Mesalox mutica* **sp. nov.**
- Empodium not more than 5-rayed, median line absent 2
2. Paraxial tibial seta l' absent on leg I 3
- Paraxial tibial seta l' present on leg I 4
3. $h1$ setae present, 14 longitudinal scorings on genital coverflap, only coxae II smooth; on *Anacardium occidentale* (Thunb.) *M. abathus* Keifer, 1969
- $h1$ setae absent, 12 longitudinal scorings on genital coverflap, both coxae smooth; on *Miconia candolleana* Triana *M. paucinotus* Flechtmann, 1995
4. Basiventral femoral seta bv absent on both legs 5
- Basiventral femoral seta bv present either on one leg or on both legs 6
5. Only coxae II smooth, genital coverflap with 10 longitudinal scorings, $h1$ setae present, empodium 3-rayed; on *Daphne mezereum* L *M. daphnei* Petanovic & Boczek, 1991
- Both coxae smooth, genital coverflap with 12 longitudinal scorings, $h1$ setae absent, empodium 5-rayed; on *Lannea wodier* L *M. odayarae* (Mohanasundaram, 1980)
6. Basiventral femoral seta bv only on leg II, both coxae ornamented; on *Parthenocissus quinquefolia* (Thunb.) *M. tuttlei* Keifer, 1962
- Basiventral femoral seta bv present on both legs, coxae either ornamented or smooth 7
7. Only coxae II smooth, 10 longitudinal scorings on genital coverflap, $h1$ setae absent; on *Malpighia glabra* L *M. trapezoidalis* Flechtmann, 2001
- Both coxae either smooth or ornamented 8
8. Both coxae smooth, genital coverflap with 10 longitudinal scorings, 3-rayed empodium, $h1$ setae present; on *Cyclobalanopsis glauca* (Thunb) *M. glaucae* Huang, 2001
- Both coxae ornamented, genital coverflap with 12 longitudinal scorings, 4-rayed empodium, $h1$ setae absent; on *Eugenia uniflora* L *M. pitangae* (Boczek & Davis, 1984)

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