The Bioscan 8(1): 339-342, 2013 (Supplement on Taxonomy)
AN INTERNATIONAL QUARTERLY JOURNAL OF LIFE SCIENCES
www.thebioscan.in

A NEW ERIOPHYID MITE (ACARI: PROSTIGMATA) FROM INDIA

SUSHILA JOSHI, PRATIBHA MENON*AND V. V. RAMAMURTHY
Network Project on Insect Biosystematics, Division of Entomology,
Indian Agricultural Research Institute, New Delhi - 110 012, INDIA
e-mail: pratibharish@gmail.com

KEYWORDS
Taxonomy
Aceria
Tamarix aphylla
Eriophyidae
India.

Received on :
17.01.2013

Accepted on :
22.02.2013

***Corresponding author**

ABSTRACT
A new species of eriophyid (Acari: Prostigmata) viz. *Aceria amrini* n. sp., was collected from *Tamarix aphylla* (Tamaraceae), from India. The distinguishing characters are 6 rayed empodium, prodorsal shield clear with no lines or granules, dorsal annuli without microtubercles, microtubercles present only on the last few annuli ventrally, antapical seta and accessory seta present. The paper includes a key to *Aceria* spp. reported from *Tamarix* spp. and a checklist of all eriophyid species known on *Tamarix* spp. with details on their synonyms, type host, damage symptoms and type locality.

INTRODUCTION

Tamarix aphylla (L) Karst, more commonly known as Athel pine, Athel tree, Athel tamarisk, and salt cedar belongs to the family Tamaraceae. It is an evergreen tree, abundant in arid regions. It has great economical value in terms of providing fuel wood, timber for furniture and has been used as a windbreak and shade tree. As part of survey conducted to study the mite biodiversity of Delhi, a new species of eriophyid, *Aceria amrini* n. sp., was collected from the leaves of *Tamarix aphylla*. So far, nine species of eriophyid mites have been reported on *Tamarix* spp. from the world. Table 1 presents a list of all eriophyids reported from *Tamarix* spp. along with their synonyms, type-host, symptoms and type-locality.

MATERIALS AND METHODS

Leaves of *Tamarix aphylla* were collected and screened in the laboratory, using Leica MZ6 stereozoom microscope. Mites were collected and mounted in a drop of Hoyer's medium. The slides were placed on a hot plate at 45-55ºC for 10-12h for clearing and drying and examined under Leica DM1000 phase contrast compound microscope fitted with a drawing tube. All illustrations have been provided with relevant scale of magnification. Classification and terminology follows Amrine *et al*., 2003. The pattern for presenting the morphometric observations is as follows: measurement of the holotype, mean ± standard deviation (range). All measurements are in micrometer (μm). Length of the body is from the apical tip of the gnathosoma to the posterior opisthosomal tip. Length of the leg is from the base of the trochanter to the anterior apical tip of the tarsus, not including the tarsal appendages (solenidion and empodium).

The type material is deposited with the National Pusa Collection (NPC), Division of Entomology, Indian Agricultural Research Institute (IARI), New Delhi 110012, India.

Family Eriophyidae Nalepa, 1898

Subfamily Eriophyinae Nalepa, 1898

Tribe Aceriini Amrine and Stasny, 1994

Genus *Aceria* Keifer, 1944

Type species: *Eriophyes tulipae* Keifer 1938:185

Aceria amrini n. sp. Joshi

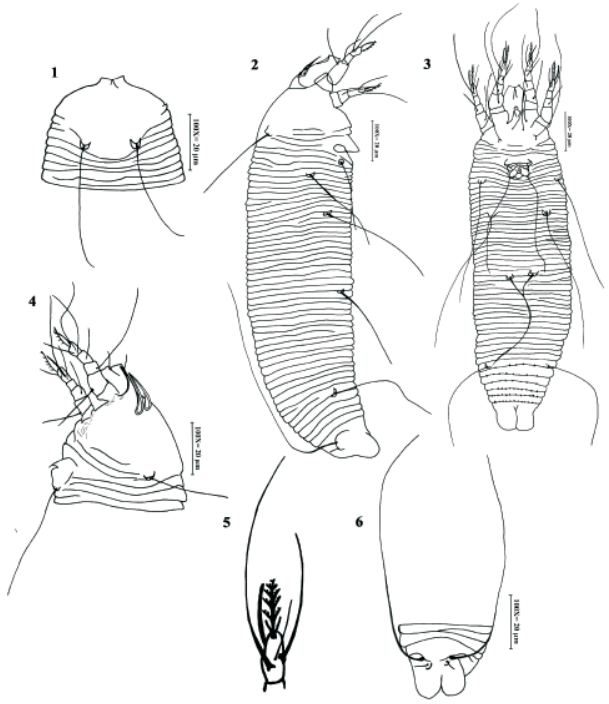
(Figs. 1-6)

Female (n = 5) – Body worm like, 210, 216.6 ± 10.1 (210-233) long, 50, 49.8 ± 0.4 (49-50) wide (Figs. 2 and 3).

Gnathosoma: Pedipalp genual setae *d* 7, 7.4 ± 1.5 (6-10); chelicerae 18, 16 ± 1.8 (14-18); gnathosoma 18, 15.8 ± 2.3 (12-18) (Fig. 4).

Prodorsal shield subtriangular; 32, 30.4 ± 1.1 (29-32) long, 38, 37.8 ± 1.7 (35-40) wide; without any lines; dorsal tubercles, situated at rear margin of the shield, 18, 18.4 ± 0.8 (18-20) apart, directing scapular seta (*sc*) divergently backwards; *sc* 42, 40 ± 1.5 (38-42), spanning 16, 15 ± 0.7 (14-16) annuli (Fig. 1).

Leg I 27, 27 ± 1.1 (26-29); femur 7, 8.2 ± 1.1 (7-9), basiventral femoral seta (*bv*) 15, 16 ± 2.6 (13-20); genu 4, 4.8 ± 0.8 (4-6), antaxial genual seta (*l″*) 28, 29 ± 1 (28-30); tibia 5, 4.8 ± 0.4 (4-5), paraxial tibial seta (*l′*) 6, 7.2 ± 1.3 (6-9); tarsus 6, 6 ± 0, solenidion 7, 8 ± 1 (7-9), rod-like, not knobbed, empodium 13, 12 ± 0.9 (11-13), simple, 6 rayed (Figure 5), paraxial fastigial seta (*ft′*) 15, 15 ± 1.7 (13-17), antaxial fastigial seta (*ft″*)



Figsure1-6: *Aceria amrini* : 1. Dorsal shield design; 2. Lateral view showing all dorsal, ventral and lateral body setae; 3. Ventral view showing setae of leg I and II, coxal setae, genitalia, ventral body setae; 4. Lateral view of prodorsal shield showing setae of Leg I and II, scapular setae and lateral prodorsal shield design; 5. Enlarged view of tarsus I showing empodium, solenidion, *u', ft'* and *ft''*; 6. Setae *h1* and *h2*. Scale as depicted

30, 30 ± 0.4 (30-31), unguinal seta (*u'*) 9, 7.2 ± 1.3 (6-9). Leg II 24, 25 ± 0.8 (24-26); femur 6, 6.4 ± 1.1 (5-8); basiventral femoral seta (*bv*) 20, 15 ± 3.3 (12-20); genu 4, 4.2 ± 0.4 (4-5), antaxial genual seta (*l''*) 10, 10 ± 0.7 (9-11); tibia 4, 4.6 ± 0.5 (4-5), paraxial tibial seta (*l'*) absent; tarsus 6, 5.8 ± 0.4 (5-6), solenidion 7, 9 ± 2.3 (7-13), rod like, not knobbed, empodium 10, 9.6 ± 0.9 (8-10), empodium simple, 6 rayed, *ft'* 8, 8.5 ± 1.3 (7-10), *ft''* 28, 29 ± 1.8 (28-32), *u'* 5, 6.6 ± 1.1 (5-8) (Figs. 3, 4).

Coxal area smooth, coxisternal seta I (*1b*) 10, 10 ± 0.4 (10-11), 11, 10 ± 0.7 (9-11) apart; coxisternal seta (*1a*) 30, 29 ± 6.6 (18-35), 6, 6 ± 0.7 (5-7) apart; coxisternal seta (*2a*) 38, 42 ± 10 (32-56), 22, 22 ± 0.5 (21-22) apart. Coxisternal area with two microtuberculate annulus (Fig. 3).

Genitalia 15, 14 ± 0.5 (14-15) wide, 15, 13 ± 1.3 (12-15) long; epigynium without longitudinal ridges or markings, smooth; proximal seta on coxisternum III (*3a*) 60, 52 ± 8.8 (41-60) (Fig. 3).

Opisthosomal annuli continuous dorsoventrally. Lateral seta (*c2*) 60, 55 ± 6.1 (45-60). Opisthosomal seta (*d*) 68, 63 ± 8.6 (50-70), 32, 31 ± 1.1 (30-32) apart, on annulus 17, 16 ± 1.3 (14-17); opisthosomal seta (e) 45, 41 ± 4.3 (34-45), 15, 13 ± 1.5 (12-15) apart, on annulus 31, 30 ± 1.2 (28–31); opisthosomal seta (*f*) 55, 50 ± 5.1 (45-55), 34, 33 ± 3.6 (28-37) apart, on annulus 48, 47 ± 1.7 (45-49). Dorsal annuli without microtubercles, total dorsal annuli 54, 53 ± 1.8 (50-54); ventral annuli with small and slightly oval microtubercles present only from seta (*f*), total ventral annuli 53, 53 ± 1.9 (50-55). Opisthosomal seta (*h2*) 130, 124 ± 14 (100-135); seta (*h1*) 4, 4.8 ± 0.8 (4-6) (Fig.s 2, 3,6).

Male – Unknown.

Holotype – Female, INDIA: I.A.R.I, New Delhi, 03 Nov. 1989, ex: *Tamarix aphylla* (Tamaraceae), Coll. Sushila Joshi, deposited with N.P.C., I.A.R.I., New Delhi.

Paratypes: Collection data same as above. 5 female on 5 microscopic slides.

Distribution: India: New Delhi.

Relationship with host plant – These mites were collected from the stem, leaves and buds of *Tamarix aphylla,* no apparent damage to host plant was observed.

Etymology – The specific name *amrini* is in honour of Dr. James Amrine, West Virginia University, in recognition of his contributions to Acarology in general and Eriophyidae in particular.

Remarks – The new species is characterized and distinguished from a more similar *Aceria tamaricis* (Trotter) in the absence of microtubercles, presence of 6 rayed empodium, prodorsal shield without any lines or median pit. A key to species of the genus *Aceria* reported on *Tamarix* sp. is provided as follows:

Key to *Aceria* spp. reported on *Tamarix* spp.

1. Empodium 5-6 rayed..... 2
   Empodium with 6 or more rays.....3
2. Prodorsal shield with median and admedian lines; submedian lines absent opisthosomal rings non-microtuberculate; empodium 5
   rayed..... *tlaiae* (Trabut, 1917)
   Prodorsal shield with median, admedian and submedian lines present; empodium 5-6
   rayed..... *arbosti* (Cotte, 1924)
3. Empodium 6 rayed; prodorsal shield without median, admedian and submedian lines; opisthosomal rings non-microtuberculate..... *amrini* n. sp.
   Empodium more than 6 rayed 4
4. Empodium 7 rayed; prodorsal shield lack central lines, curved lines and short median present at rear margin of shield between dorsal tubercles; opisthosomal rings with rounded microtubercles.....*dioicae* (Keifer, 1979)
   Empodium 7-8 rayed in protogyne, 8-9 rayed in deutogyne; prodorsal shield without median, admedian and submedian lines; small pit centrally located on the rear shield margin; opisthosomal rings with elliptical microtubercles..... *tamaricis* (Trotter, 1901)

ACKNOWLEDGEMENTS

The authors are grateful to Dr. James W. Amrine, West Virginia University, USA for his confirmation on the material and for providing the new species status through examination of the material and providing useful comments on its description. The authors thank Ms. Luvlesh Rawat for rendering her efforts in setting images in photoshop. Also, literature support provided by Dr. Mariuz Lewandowski, Warsaw Agricultural University, Poland; Dr. Debra Creel, ARS, USDA, Dr. De Lillo, University of Bari, Italy is gratefully acknowledged. The authors

Table 1: List of eriophyid mites collected from *Tamarix* spp.

Species	Host	Symptom	Type locality
Aceria amrini n. sp.	*Tamarix aphylla*	Collected from stem, leaves and buds with no apparent damage to host.	I.A.R.I., New Delhi, India
Aceria arbosti (Cotte) *Eriophyes arbosti* Cotte, 1924:7	*Tamarix africana* Poir	Twig and leaf deformation.	Gorge of St. Andre, route de falicon, Provence, France.
Aceria arbosti (Cotte): Castagnoli, 1992:447 *Aculus arbosti* (Cotte): Amrine & Stasny 1994:134			
Aceria dioicae (Keifer) *Eriophyes dioicae* Keifer, 1979:5	*Tamarix dioica* Roxb., *Tamarix ericoides* Rottl., *Tamarix hispida* Willd., *Tamarix nilotica* (Ehrenb.) Bung., *Tamarix tetragyna* Ehrenb., *Tamarix ericoides* Rottl., *Tamarix hispida* Willd.	Bud gall, galls	Wazirabad, Pakistan, Egypt, Iran, India, Israel
Aceria dioicae (Keifer): Castagnoli, 1992:447;Amrine & Stasny 1994:42 *Eriophyes synchytrioides* Dcbski, 1918:26; Abou-Awad & Borolossy 1995: 146			
Aceria tamaricis (Trotter) *Eriophyes tamaricis* Trotter, 1901:953; Trotter & Cecconi, 1904:289 *Aceria tamaricis* (Trotter): Castagnoli, 1992:447; Amrine & Stasny 1994:90	*Tamarix* sp.,*Tamarix chinensis* Lour., *Tamarix gallica* L., *Tamarix ramosissima*, *T. smirnensis* Bunge.	Cause twig knots, 4-8 mm long, galls are green, soft, like small tunnels on the young branches. In time, the galls turn light red to brown and get harder	Cecidotheca Italica, Lake Isnik near Bazarkioi, Asia Minor, Turkey,; Thessaloniki, Greece, China France
Aceria tlaiae (Trabut) *Eriophyes tlaiae* Trabut, 1917:29; De Bergevin, 1917:94 *Aceria tlaiae* (Trabut,): Castagnoli, 1992:447; Amrine & Stasny 1994:92	*Tamarix articulata* Vahl	Irregularly round galls. Appears as a large protuberance on young green branches or at their apex. Size from a few mm in diameter to 10 x 25 mm	Takout, Morocco, Algiers, India, Israel, Morocco, Pakistan
Eriophyes strobilobius Dcbski *Eriophyes strobilobius* Dcbski, 1918:25: Amrine & Stasny 1994:216	*Tamarix nilotica* (Ehrenb.) Bung.	Galls	Egypt
Eriophyes tetragynae Dcbski *Eriophyes tetragynae* Dcbski, 1918:27: Amrine & Stasny 1994:215	*Tamarix tetragyna* Ehrenb.	Galls	Egypt
Vasates immigrans (Keifer) *Phyllocoptes immigrans* Keifer, 1940:29; Mohanasundaram 1982:419 *Aculops immigrans* (Keifer): Keifer 1967:4			
Vasates immigrans (Keifer): Keifer 1952:45; Davis et al., 1982:169; Amrine & Stasny 1994:309	*Tamarix gallica* L., *Tamarix plumosus* L.	The mites were under scale-like leaves and on stems.	Sacramento, California, USA; India, Poland
Dicruvasates tamaricis Abou-Awad & El-borolossy, 1995:145	*Tamarix nilotica* (Ehrenb.) Bung.	Vagrant preferring twigs and causing rusting.	El-fayum, Egypt.

are grateful to ICAR for funding Network Project on Insect Biosystematics.

REFERENCES

Abou-Awad, B. A. and El-borolossy, M. A. 1995. Two eriophyid mites on tamarisk trees in Egypt (Acari: Eriophyoidea: Eriophyidae). *Acarologia*. **36(2):** 145-148.

Amrine, J. W. Jr. and Stasny, T. A. 1994. Catalog of the Eriophyoidea (Acarina: Prostigmata) of the world. Indira Publishing Houses, W. Bloomfield, Michigan, USA: Publisher. p. 798.

Amrine, J. W. Jr., Stasny, T. A. and Flechtmann, C. H. W. 2003. Revised keys to world genera of Eriophyoidea (Acari: Prostigmata). Indira Publishing Houses, W. Bloomfield, Michigan, USA: Publisher. p. 244.

Castagnoli M. 1992. Redescription of *Aceria tamaricis* (Trotter, 1901) (Acari: Eriophyidae). *Redia*. **75(2)**: 447-452.

Cotte, J. 1924. Les cecides des Alpes Maritimes et leurs producteurs. *Mem. Soc. Linneenne de Provence*. **3**: 1-56.

Davis, R., Flechtmann, C. H. W., Boczek, J. H. and Barke, H.E. 1982. Catalogue of Eriophyid mites (Acari: Eriophyoidea). Warsaw Agricultural University Press, Warsaw, Poland: Publisher. p. 254.

Dcbski, B. 1918. Liste des cecides signalees en Egypte jusqu'a ce jour. *Mem. Soc. Entomol. Egypte*. **1(4)**:1-37.

De Bergevin, E. 1917. Remarks on the galls caused by *Eriophyes tlaiae* on *Tamarix articulate. Bull. Soc. Hist. Nat. Afr. Nord, Algiers*. **8(4)**: 94-95.

Keifer, H. H. 1938. Eriophyid studies I. *Bull. Dept. Agric. Calif*. **27**:181-206.

Keifer, H. H. 1940. Eriophyid studies VIII. *Bull. Dept. Agric. Calif*. **29**: 21-46.

Keifer, H. H. 1944. Eriophyid studies XIV. *Bull. Dept. Agric. Calif*. **33**:18-38.

Keifer, H. H. 1952. The Eriophyid mites of California (Acarina, Eriophyidae). *Bull. Calif. Insect Survey*. **2(1):** 1-123.

Keifer, H. H. 1967. Reference list, general index, host index. Special Publication. California Department of Agriculture: Publisher. p.12.

Keifer, H. H. 1979. Eriophyid studies C-16. *Agricultural Research Service,* U.S. Deptt. of Agriculture: Publisher. p. 24.

Mohanasundaram, M. 1982. New species and records of gall mites (Acarina: Eriophyidae) from Tamil Nadu, India. *Orient. Insects*. **16(4)**: 419-429.

Nalepa, A. 1898. Zur Kenntniss der Gattung *Trimerus* Nal. *Zool. J*. **11**: 405.

Trabut 1917. La galle du *Tamarix articulate*

dite Tak'out au Maroc. *Bull. Soc. Hist. Nat. Afrique Nord*. **3**: 29-30.

Trotter, A. 1901. Di una nuova specie d'Acaro (*Eriophyes*) d' Asia Minore produttore di galle su *Tamarix*. *Atti R. Ist. Ven. Sci. Lett. Ed Aeti*. **60(2)**: 953-955.

Trotter, A. and Cecconi, G. 1904. Cecidotheca Italica. *Avellino, fasc.* **12**: 289.