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Orijinal araştırma (Original article)

A new record for Iranian false spider mites with key to the known species of Tenuipalpidae (Acari: Prostigmata) in Iran

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Summary

Cenopalpus ruber Wainstein is reported for the first time from apple leaves in Zanjan province located in the northwest of Iran. *Tenuipalpus pistaciae* Sepasgozarian and *Pentamerismus kamalii* Barimani reported from Iran are considered as invalid species names. An identification key is also provided to distinguish known species of Tenuipalpidae from Iran.

Key words: Acari, Tenuipalpidae, *Cenopalpus ruber*, Iran

Anahtar sözcükler: Acari, Tenuipalpidae, *Cenopalpus ruber*, İran

Introduction

Many phytophagous mite species e.g. belonging to Tenuipalpidae are considered pest of plants (Duzgunes, 1970; Evans et al., 1998). Comprehensive studies were undertaken world-wide on the fauna of this family, namely: Australia (Smiley & Gerson, 1995), Pakistan (Chaudhri, 1971; Akbar & Chaudhri, 1985), Greece (Hatzinikolis, 1985; 1986a; 1986b; 1987; Hatzinikolis et al., 1999; 2001), Thailand (Baker, 1975), United States (Baker & Tuttle, 1972), Hungary (Bozai, 1971), New Zealand (Collyer, 1973 a, b), Iran (Dosse, 1971; Sepasgosarian, 1996; Khosrowshahi & Arbabi, 1997), Turkey (Duzgunes, 1963, 1970; Uysal et al., 2001); Honduras (Evans et al., 1993), Bermuda (Evans et al., 1998), India (Gupta & Gupta, 1978; Maninder & Ghai, 1978); China (Ma & Yuan, 1980); USSR (Wainstein & Gelovani, 1983). Smith Meyer (1979) provided a key to the world fauna of this family.

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These mites have a wide range of hosts, including fruits, ornamentals, and forest plants. Childers et al. (2003a) reported 928 host species in 513 genera and 139 families for false spider mites. These mites were also listed as vectors of plant viruses (Rodrigues & Nogueira 1996; Chagas et al., 2003; Childers et al., 2003b; Rodrigues et al. 2003; 2005). Therefore, a good knowledge of the pest species of the Tenuipalpidae is important for the implementation of efficacious control measures.

The fauna of the Tenuipalpidae is better known comparretively to the other mite families of Iran (except Tetranychidae and Phytoseiidae), According to the literature, about 40 recorded and described species are known from Iran (Dosse, 1971; Sepasgosarian, 1996; Khosrowshahi & Arbabi, 1997). This study was mainly based on the tenuipalpids listed in the catalog of Kamali et al. (2001) on the known Iranian mite fauna. Northern parts of Iran have similar habitats and fauna to northern neighboring countries, formerly part of the Soviet Union and Turkey. Ignorance of the extensive work done on the taxonomy of Tenuipalpidae in other countries, unfortunately, has caused some species to be misidentified or even described as new to science in Iran.

In this paper, we reported a species new for the Iranian tenuipalpid fauna and provided a key to separate the known species of Iranian Tenuipalpidae Berlese. Previously reported two species from Iran are consider to be invalid. The paper dealt with 42 known species in 8 genera from Iran. Also remarks on *Cenopalpus ruber* Wainstein were given based on Iranian specimens as new record for Iran.

Material and Methods

Samples consisted of twigs, old and new leaves were collected from inside and outside of the canopy of the plants. Each sample was placed in a paper bag that was also placed inside of a plastic bag. The bags were transferred to the laboratory, where they were processed. Samples were washed in a solution of commercial detergent (5%). The solution was filtered using two overlapping sieves (16 Mesh; 270 Mesh). The larger sieve retained debris and the other retained the mites, which were then washed with 70% ethanol into a Petri dish. The ethanol solution was inspected under the stereomicroscope. All mites of the family Tenuipalpidae were slide mounted in Hoyer's medium. They were identified using an optic microscope. All measurements are given in µm (micrometers). The voucher material of new species, preserved as slide-mounted specimens, will be deposited in the mite collection of Department of Entomology, Faculty of Agriculture, Tarbiat Modares University, Tehran, Iran.

Results

***Cenopalpus ruber* Wainstein, 1960**

This species is reported for the first time from Iran.

Collection data: 10. IV. 2006 in Zanjan on apple (*Pirus malus* L.), 4 females.

Adult Female (4 individuals): Rostrum broad at base, long, extending beyond anterior margin of femur I. Rostral shield emarginated medially. Idiosoma has dorsal integument bearing polygonal reticulations medially. Dorsal setae are not long. Femur, genu and tibia of legs I and II each with a strong serrate dorsal seta. Claw with hook, length of body is 310 (307-311) μm, including rostrum 339 (336-342) μm, width at widest level of podosoma is 170 (168-171) μm. Propodosoma centrally reticulated, with two pairs of ocelli on prodorsum. Hysterosoma apparently also reticulated centrally with diagonal lateral striae. Palpus 4 segmented, terminal segments with 2 setae. Setae ve 18 (17-20), Sci 15 (14-16), Sce 16 (15-18), c1 9 (8-10), c2 18 (17-19), c3 18 (17-19), d1 8 (8), d3 16 (14-17), e1 8 (8), e3 16 (14-17), f1 10(9-12), f2 10 (9-12), h1 7 (7), h2 8 (7-9). Ventral opisthosomal setae smooth. Number of setae on segments from coxa to tarsus: leg I) 2, 1, 4, 3, 5, 7; leg II) 2, 1, 4, 3, 5, 7; leg III) 1, 2, 2, 1, 3, 5; leg IV) 1, 1, 1, 0, 3, 5.

Key to the species of Tenuipalpidae of Iran

1. Dorsosublateral setae (c2) present **2**

- Dorsosublateral setae absent **7**

2. Hysterosoma with one pair of dorsosublateral setae……..

……*Cenopalpus* Pritchard and Baker **25**

- Hysterosoma with at least two pairs of dorsosublateral setae **3**

3. With 11 pairs of dorsal setae on hysterosoma; palpus with a single segment fused with rostrum……*Obdulia tamaricis* Pritchard and Baker

- With more than 11 pairs of dorsal setae on hysterosoma; pedipalp with at least two segments **4**

4. Pedipalp with two segments **5**

- Pedipalp with more than two segments **6**

5. With 4 pairs of dorsosublateral setae (c2, d2, e2 and f2), the second and third pairs shorter than the first ones; rostral shield absent……

..... *Raoiella indica* Hirst.

- With 3 pairs of dorsosublateral setae (c2, d2 and e2); rostral shield present; globular idiosoma bearing fan-shaped veined setae, the first pair of propodosomal setae very broad near middle……...

……*Phyllotetranychus aegyptiacus* Sayed

6. With 2 pairs of dorsosublateral setae (c2 and d2); rostral shiel with broad lobs……..…..*Pentamerismus* Mcgregor **38**

- With 4 pairs of dorsosublateral setae…….*Aegyptobia* Sayed **8**

7. Pedipalp with one to three segments; penultimate pair of dorsolateral setae flagelliform, podosoma broader than the narrow opisthosoma…… …..……..*Tenuipalpus* Donnadieu **14**

- Pedipalp with four segments; penultimate pair of dorsolateral setae of normal length…….*Brevipalpus* Donnadieu **21**

8. Tarsal claw with hook **9**

- Tarsal claw without hook, hysterosoma divided medially by transverse striae and with reticulations caudally…….*Aegyptobia glyptus* (Sayed)

9. Propodosomal setae broadly lanceolate **13**

- Propodosomal setae setiform to narrowly lanceolate **10**

10. Propodosomal setae setiform, rostrum extending to distal end of genu I ….……:…….*Aegyptobia tragardhi* Sayed

- Propodosomal setae narrowly lanceolate **11**

11. Propodosoma smooth, anterior margin of propodosoma with a fairly deep cleft…….....*Aegyptobia beglarovi* Liv.

- Anterior margin of propodosoma without deep cleft **12**

12. Anterior margin of propodosoma emarginate……

……..…….*Aegyptobia persica* Khosrowshahi & Arbabi

- Anterior margin of propodosoma not emarginated……..

……..*Aegyptobia ueckermanni* Khosrowshahi & Arbabi

13. Propodosoma reticulated dorsally……..

……*Aegyptobia daneshvarii* Parsi and Khosrowshahi

- Propodosoma striated dorsally……

……*Aegyptobia meyerae* Khosrowshahi & Arbabi

14. With less than 3 pairs of dorsocentral setae; dorsal integument nearly smooth; podosoma with 2 pairs of posterior mediolaterals……

……..*Tenuipalpus granati* Sayed

- Podosoma with one to 4 pairs of posterior medioventral setae **15**

15. Podosoma with one pair of anterior medioventral setae **16**

- Podosoma with two pairs of anterior medioventral setae **20**

16. Podosoma with one pair of posterior medioventral setae **17**

- Podosoma with at least two pairs of posterior medioventral setae **18**

17. Third pair of propodosomal setae longer than half of the distance between their base and posterior margin of propodosoma……

……*Tenuipalpus portulacea* Parsi, Khosrowshahi and Farid

- Third pair of propodosomal setae shorter than half of the distance between their base and posterior margin of propodosoma; propodosoma and hysterosoma with longitudinal striae laterally and mediolateral part of it elevated……*Tenuipalpus punica* Pritchard and Baker

18. Podosoma with 4 pairs of posterior medioventral setae, dorsum with striae and 3 pairs of dorsocentral setae……..

……*Tenuipalpus eriophyoides* Baker

- Podosoma with 2 pairs of posterior medioventral setae **19**

19. Dorsum completely reticulated……

……*Tenuipalpus kamalii* Khosrowshahi & Arbabi

- Only dorsosublateral area reticulated..*Tenuipalpus eunymi* Khosrowshahi

20. Rostral shields with two lobs at each side…….

……*Tenuipalpus parsii* Khosrowshahi & Arbabi

- Rostral shields with three lobs at each side……..

……*Tenuipalpus daneshvari* Khosrowshahi & Arbabi

21. With 5 pairs of dorsolateral setae **22**

- With 6 pairs of dorsolateral setae **24**

22. Tarsus II with two solenidia distally, hysterosoma with 3-4 longitudinal rows of polygonal cells mediolaterally…….*Brevipalpus phoenicis* (Geijkes)

- Tarsus II with one solenidion distally **23**

23. Dorsum mostly reticulate, propodosoma smooth mediodorsally and evenly reticulated mediolaterally, consisting of 4-6 rows of polygonal cells ……..……..……*Brevipalpus obovatus* Donnadieu

- Dorsum completely covered with longitudinal, straight striae, ventral and genital plates with reticulations……*Brevipalpus mcgregori* Baker

24. Propodosoma with irregular coalesced areolae, dorsal setae expanded distally, propodosoma with irregular coalesced areolae…….……..….

…….*Brevipalpus olearius* Sayed

- Propodosoma partially reticulated mediolaterally and with irregular crenulations dorsomedially; dorsal setae setiform……..……...……

……Brevipalpus lewisi Mcgregor

25. Idiosoma mostly striated, propodosomal setae broadly lanceolate **26**

- Idiosoma mostly reticulated **27**

26. Sixth pair of dorsolateral setae longer than fourth and fifth pairs…….

………..……*Cenopalpus lineola* Can. and Fan.

- Sixth pair of dorsolateral setae shorter than fourth and fifth pairs…..…….

…………*Cenopalpus saryabiensis* Akbar & Chaudhri

27. Dorsal propodosomal setae narrowly lanceolate to setaceous **28**

- Dorsal propodosomal setae broadly lanceolate to spatulate **34**

28. First pair of propodosomal setae extends almost to base of opposite member **29**

- First pair of propodosomal setae shorter than distance to base of opposite member **31**

29. Rostral shield with four lobs, hysterosoma with dorsocentral setae narrowly lanceolate……*Cenopalpus irani* Dosse

- Rostral shield with two lobs **30**

30. Propodosoma with smaller, rounded, crenulate elements dorsally ……..…….....……*Cenopalpus spinosus* (Donnadieu)

- Propodosoma with larger, polygonal reticulations dorsally……

…..……..…*Cenopalpus pulcher* (Can. and Fan.)

31. Rostrum not reaching to distal end of genu I, dorsal body setae narrowly lanceolate, the fourth pair of dorsolateral setae is the longest ……*Cenopalpus ruber* Wainstein

- Rostrum not reaching beyond distal end of femur I **32**

32. Rostral shield with two medial and two lateral lobs……..

……..…*Cenopalpus bakeri* Duzgunes

- Rostral shield with two medial and four lateral lobs **33**

33. Dorsocentral setae lanceolate.....*Cenopalpus crataegi* Dosse

- Dorsocentral setae not lanceolate…….*Cenopalpus meyerae* Khosrowshahi

34. Rostrum reaching beyond distal end of femur I **35**

- Rostrum not reaching beyond distal end of femur I…….……

  ……...*Cenopalpus pritchardi* Duzgunes

35. Dorsal propodosomal setae shorter than distance between bases of consecutive setae and serrate……..…..*Cenopalpus lanceolatisetae* (Attiah)

- Dorsal propodosomal setae longer than distance between bases of consecutive setae **36**

36. All dorsal setae broadly lanceolate to spatulate **37**

- All dorsal setae not broadly lanceolate to spatulate

  .....…*Cenopalpus abaii* Khosrowshahi & Arbabi

37. Rostral shield with two median lobs.…..*Cenopalpus pennatisetis* Wainstein

- Rostral shield with four median lobs…..…..*Cenopalpus evini* Khosrowshahi

38. Hysterosoma with six pairs of dorsolateral setae **39**

- Hysterosoma with seven pairs of dorsolateral setae…….....

  ……*Pentamerismus foliisetis* Liv. and Mitro.

39. Palpal tibia (fourth segment) with one setae, femur I with dorsal setae broadly lanceolate; propodosoma not emarginated anteriorly, hysterosomal setae lanceolate to spatulate……..

  ……..…….*Pentamerismus canadensis* Mc Gregor

- Palpal tibia (fourth segment) with two setae, propodosoma emarginated anteriorly, hysterosomal setae setiform **40**

40. Propodosoma with first and second pairs of setae broadly lanceolate…….

.....*Pentamerismus judiciarius* Deleon

- Propodosoma with all three pairs of setae setiform……

……....*Pentamerismus oregonensis* Mc Gregor

Remarks

The status of *Tenuipalpus pistaciae* Sepasgozarian which was reported by Khalilmanesh (1973) was not clear. Figures, a description and specimens of *T. pistaciae* Sepasgozarian could not be found (Personal communication of Hasan Rahmani with Iranian Research Institute of Plant protection) which made an examination impossible. Therefore, it is considered here as a *nomen dubium*. Barimani (1996) cited the name *Pentamerismus kamalii* Barimani *n*. sp. but there was no description of this species available. This species is considered to be *nomen nudum*. It was described in an unpublished MSc thesis (Barimani, 1996) without deposition of any type material. At this moment, we consider above mentioned species invalid pending official publications and discovery of type material.

Discussion

In the East Azerbaijan Province of Iran, a survey found 23 mites species associated with economic plants; the flat scarlet mite (*C. pulcher*) was included among the six most injurious species (Daneshvar, 1978). Specimens of *C. ruber* with *C. pulcher* populations on apple leaves in Zanjan Province was collected by the senior author and it seemed that damage to the leaves was due to both species. In Egypt, *Amblyseius enab* El-Badry effectively controlled *C. pulcher* in apricot orchards (El- Halawany et al., 1990).The predaceous mites *Amblyseius swirskii* Athias-Henriot and *Pronematus ubiquitus* McGregor seem to play an important role in controlling of tenuipalpids (Zaher et al., 1971). Tydeids are known from all major continents. *Pronematus ubiquitus* was reported from Iran (Kamali et al., 2001) and also collected by the first author from apple (Pirus malus) leaves that, were infested with *C. ruber*. *C. ruber* appeared to be a minor problem in Iran. This may be related with one of the following reasons: frequent application of pesticides or effective natural control of this mite by natural enemies. There is no data on biology of this mite in Zanjan region yet.

A very wide large number of host plants were reported for tenuipalpid mites in Iran (Kamali et al., 2001) Thus it is important to intensify the surveys of tenuipalpid mites and associated diseases in the diverse regions of Iran. Additionally viruses' transmiting capacity of different species belonging to this

family also needs urgent attention. This information is imperative for the definition of strategies of control in an integrated pest management program. Continuation of taxonomic aspects of this group is essential for the prevention of the dissemination of harmful vector species to regions in Iran not infested with these species.

Özet

İran yassıakarlarından yeni bir kayıt ve İran'daki Tenuipalpidae (Acari: Prostigmata) türlerinin teşhis anahtarı

Cenopalpus ruber Wainstein İran'ın kuzeybatısındaki Zanjan bölgesindeki elma yapraklarında ilk kayıt olarak saptanmıştır. İran'dan bildirilen *Tenuipalpus pistachia* Sepasgozarian ve *Pentamerismus kamalii* Barimani geçersiz tür isimleri olarak dikkate alınmıştır. Ayrıca İran'da bilinen tenuipalpid türlerinin ayırt edilebilmesi için bir tanı anahtarı hazırlanmıştır.

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