A revision of the genus Cenopalpus in Greece (Acari: Tenuipalpidae)

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A Revision of the Genus *Cenopalpus* in Greece (Acari: Tenuipalpidae)

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ABSTRACT

The genus *Cenopalpus* from Greece is revised and a key to 17 species is provided, with illustrations of the nymphs. Of these species, *C. bakeri* Dügünès, *C. carpini* (Livshitz and Mitrofanov) and *C. pseudospinosus* (Livshitz and Mitrofanov) are recorded for the first time from this country. A new species *C. arbuti* is described and illustrated. Information on the hosts, distribution data and economic importance is presented for each species. Some of the hosts and damage symptoms are recorded for the first time.

Introduction

Pritchard and Baker (1958) proposed the genus *Cenopalpus* for those species of *Brevipalpus* in which the first pair of dorsosublateral hysterosomal setae is present and the solenidia on tarsi I and II are slender and tapering. Wainstein (1960), Mitrofanov (1973) and Chaudhri et al. (1974) recognized *Cenopalpus* as a valid genus. Meyer (1979) described a new species which has the general features of a *Cenopalpus* species but it lacks the first pair of dorsosublateral setae. She did not accept *Cenopalpus* as a valid genus. Later, contrary to the opinion of Meyer, Akbar and Chaudhri (1985) continued to accept *Cenopalpus* as a valid genus.

*Cenopalpus* Pritchard and Baker (1958) is distinguished by the four-segmented palpus, 5 or 6 pairs of hysterosomal dorsolateral setae, one pair of dorsosublateral setae, and three pairs of dorcocentral hysterosomal setae. Solenidia on tarsi I and II are also slender and tapering. The genital plate is broader than the anterior ventral plate. Nymphs are useful in species identification. *Cenopalpus* species, some of considerable economic importance, have been recorded from Europe, Africa, Asia and Australia. Although, a relatively large number of *Cenopalpus* species is known from Greece, there is no information about the distribution, economic importance, relation to host plants etc. Those species were recorded by Hatzinikolis as follows: 1969a *C. pulcher* from loquat, 1969b *C. eriobotryi* n. sp. from loquat, 1970 *C. lieneola* from pine, 1982 *C. platani* from *Platanus*, *C. pterinus* from *Rosmarinum officinalis*, *C. spinosus* from rasberry, 1983 *C. lanceolatissima* from apricot, *C. mespili* from apple, *C. pennatisetis* from willow, *C. populi* from poplar, *C. pritchardi* from apple, *C. ruber* from *Thuja* and *C. wainsteini* from pine.

Materials and Methods

The material for this study was collected at the Acarology Laboratory, during the period 1966-85, from plant samples which were provided by Agricultural Institutions, local Agricultural Services, individuals or collected by the first author. Methods of collecting, killing, preservation, clearing, pigmentation, fixing and mounting were described by Hatzinikolis (1982). Most of the samples were collected in the eastern part of Greece, including Macedonia, and to a lesser extent in western Greece, Thrace and the Islands. The great majority of samples was taken from cultivated fruit trees, vegetables, ornamental plants, fodder, grapes and crops cultivated for the food processing industry. A limited number of samples was also taken from cereals, forest trees and various indigenous plants. All the material is deposited in the collection...
Results and Discussion

The present study has revealed the presence of C. bakeri, C. carpini, C. pseudospinosus and C. arbuti n. sp. in addition to the 13 previously known species. Female, male, and deutonymph of C. arbuti are described and illustrated. The symptoms induced by the 17 mites are briefly described and the host range of each species is also included. A key based on the female and nymph is provided. Illustrations of nymphs (dorsal view showing setae) to facilitate the separation of the species of Cenopalpus in Greece are given (Figs. 11-26).

a. Description

Cenopalpus arbuti n. sp.

FEMALE

Dimensions, colour. Body length 375, including rostrum 388; width 194; colour bright red (all measurements are given in microns, μm).

Dorsum (Fig. 1). Rostral shield smooth with one relatively long median and one short lateral lobes on each side. Dorsal integument with large polygonal reticulations. All dorsal setae long and narrowly lanceolate. Prosomal body setae 51, 47 and 42 in length. Dorsolateral hysterosomal setae 47, 44, 32, 44 and 22 in length. Hymeral setae 49. Dorsosublateral setae 42. Dorsocentral setae 53, 51 and 28 in length.

Venter (Fig. 2). Metapodosoma with venter smooth except for reticulations behind posterior medioventrals and posterolaterally of coxae III and IV. Several striae present between posterior end of coxae IV. Vetrail propodosomal setae 61. Anterior and posterior medioventral metapodosomal setae 28 and 53, respectively. Ventral and genital plates with one and two pairs of large lanceolate setae, respectively. Ventral and genital plates not entirely covered by reticulations; in ventral plate those reticulations cover most of the central area while in genital plate there are no reticulations anteriorly and posteriorly. Ventral and genital plates with one and two pairs of large lanceolate setae, respectively. Annal plate with large reticulations.

FIG. 1. Cenopalpus arbuti, n. sp., holotype, female, dorsal aspect.

FIG. 2. Cenopalpus arbuti, n. sp., female, ventral aspect.
a sensory seta (13 in length) and a shorter sensory peg (6 in length) distally. Rostrum reaching before end of femur I.

Legs. Inclusive counts of setae and solenidia (in parentheses) on the podomeres of legs I-IV: tarsi 6(2)-6(2)-5-5; tibiae 5-5-5-3; genua 3-3-1-0; femora 4-4-2-2; trochanters 1-1-1-0; coxae 2-2-1-1. Tarsi I and II (Figs. 5 and 6) each with two slender sensory rods dorsodistally; sensory rod measure 14, 12 and 12, 11, respectively. Femur I (Fig. 7) with inner distal seta less lanceolate and shorter (3/4 in length) than the inner dorsal. Femur II (Fig. 8) with inner dorsal and inner distal setae large, lanceolate, measuring 28 and 17, respectively; the proximal seta slender, lanceolate, 33 in length.
MALE

Dimensions, colour. Body length 232, including rostrum 256; width 127; colour red.

Dorsum (Fig. 9). Rostral shield with rectangular reticulations and one long median lobe. Dorsal integument with polygonal reticulations which are smaller than those of female. All dorsal setae long and similar to those of female. Prosomal body setae 35, 35 and 40 in length. Dorsolateral hysterosomal setae 51, 51, 33, 37, and 21 in length. Hymeral setae 47. Dorsosublateral 37. Dorsocentral setae 27, 32, and 19 in length.

Gnathosoma. Rostrum reaching after middle of femur I. Palpus similar to female.

Legs. Similar to female.
NYMPH (Fig. 10)

Body length, including rostrum 222, width 116. The number, arrangement and shape of the dorsal body setae are similar to those of the female except hysterosoma with fourth and fifth dorsolateral and third dorsolateral minute, prosomals 30, 30 and 32 in length. Hymerals 45. Dorsosublaterals 53. First three dorsolateral setae 46, 55, 55 in length while fourth and fifth ones minute. First and second dorsocentrals 70, 80 in length and third minute.

TYPE MATERIAL

Holotype female, five paratype females, three paratype males, two paratype nymphs, and one paratype pronymph, September 1968, Marmari, Evvia, Greece (Code Number 178/68). The material was collected by the senior author from Arbutus unedo (strawberry) and is mounted on six slides which are deposited in the collection of the Acarology Laboratory of the Agricultural Research Centre of Athens.

RELATION TO HOST

The mites were found on the ventral surface of the leaves.

ETYMOLOGY

The name of this new species is derived from Arbutus.

b. Remarks

This new species is related to C. pterinus Pritchard and Baker, 1958. However, the female can be separated from the latter by the following: rostrum reaching before end of femur I, the dorsal body setae narrowly lanceolate to setiform, rostral shield smooth with two median and two lateral lobes, and tarsi I and II each with two solenidia. Dorsal integument of the male is provided with polygonal unsubdivided reticulations. In the nymph, fourth and fifth dorsolateral and third dorsocentral hysterosomal setae are minute.

c. Key to species based on females and nymphs

1. Hysterosoma with five pairs of dorsolateral setae ........................................ 2
   - Hysterosoma with six pairs of dorsolateral setae ........................................ 3
2. Rostrum extending beyond end of femur I. Dorsal setae featherlike. Nymphs 1, 2, 4 dorsolateral setae long; 3, 5 minute ........................................ pterinus
- Rostrum reaching before end of femur I. Dorsal setae narrowly lanceolate. Nymphs 1, 2, 3 dorsolateral setae long; 4, 5 minute
  lancelolatae
3. Idiosoma mostly striate
  - Idiosoma mostly reticulate
4. Rostral shield shallowly incised; metapodosomal dorsum smooth. Nymphs 1, 2, 3, 4, 5 dorsolateral setae long; 6 small
  lanceola
5. Rostral shield deeply incised; metapodosomal dorsum striate. Nymph 1 dorsolateral seta small; 2, 3, 4, 5, 6 long
  wansteini
6. Propodosoma with dorsal setae narrowly lanceolate to setiform
  - Propodosoma with dorsal setae broadly lanceolate to spatulate
7. Propodosomal setae setiform. Rostral shield with more than 4 lobes
  - Propodosomal setae narrowly lanceolate. Rostral shield with 4 lobes. Nymphs 1, 2, 4 dorsolateral setae long; 3, 5, 6 minute
  spinosus
8. Propodosoma with small, round, granulate elements dorsally. Nymphs 1, 2, 3 dorsolateral setae long; 4 very
  long; 5, 6 minute
  pseudospinosus
9. Rostrum no more than end of femur I
  - Rostrum extending to middle of femur I and more
10. Rostrum reaching end of femur I. Propodosoma with smaller, rounder granulate elements dorsally. Nymphs 1, 2, 3, 4 dorsolateral setae long; 5, 6 minute
  bakers
11. Rostrum extending to middle of femur I and more
  - Rostrum reaching middle of genu I. Dorsal body setae narrowly lanceolate. Nymphs 1, 2, 3 dorsolateral setae long; 4 very long; 5 medium; 6 minute
  ruber
12. Metapodosomal venter with medial linear texture or reticulation elements between coxae IV polygonal and broader than long. Nymphs 1, 2, 4, 4 dorsolateral setae long; 3 small; 5 minute
  carpini
  - Metapodosomal venter with polygonal granulate elements medially equal breadth and length. Nymphs 1, 2, 3, 4 dorsolateral setae long; 5, 6 minute
  mespili
13. Propodosoma with dorsal setae longer than distance between bases of consecutive setae. Nymphs 1, 2, 3, 4, 5 dorsolateral setae long; 6 small
  pennatisetae
  - Propodosoma with dorsal setae shorter than distance between bases of consecutive setae.

Nymph 1 dorsolateral seta long; 2, 3, 4, 5 small; 6 minute

14. Dorsal body setae subspatulate
  - Dorsal body setae broadly spatulate. Nymphs 1, 2 dorsolateral setae long; 3, 5, 6 minute
  eriobotryi
15. Metapodosomal venter not reticulate anteriorly to ventral plate. Nymphs 1, 2, 4 dorsolateral setae long; 3, 5, 6 minute
  platani
  - Metapodosomal venter reticulate anteriorly to ventral plate. Nymphs 1, 2 dorsolateral setae long; 3 small; 4 very long; 5, 6 minute
  pritchardi

D. Notes on the species

Cenopalpus bakeri Düzgünes, 1967

Cenopalpus bakeri Düzgünes, 1967. Brevipalpus bakeri Meyer, 1979.
Records: Iran, Turkey.
Host: Crataegus (hawthorn).
New records: Evros, Drama on hawthorn.
Relation to host: This mite has been found in small populations on both leaf surfaces.

FIG. 11. C. bakeri, nymph, dorsal view showing setae.

Cenopalpus carpini (Livshitz and Mitrofanov)

Brevipalpus carpini Livshitz and Mitrofanov, 1967; Meyer, 1979.
Record: U.S.S.R.
Host: Carpinus orientalis.
New records: Imathia and Pella on Populus.
Relation to host: This mite has been found in small populations on the ventral surface of leaves.

*Cenopalpus eriobotriyi* Hatzinikolis

*Cenopalpus eriobotriyi* Hatzinikolis, 1969 b.
*Brevipalpus eriobotriyi* Meyer, 1979.
Record: Greece (Attiki).
Host: *Eriobotrya japonica* (loquat).
New records: Ahaia, Argolis, Arta, Attiki, Eto-loakarnania, Ilia, Messinia, Preveza on loquat trees and *Pyrus communis* (pear).
Relation to host: This mite is an important pest of loquat and pear. It is found on the ventral side of the leaf near the base of the main rib and on the fruits. It causes cellular necroses of the epidermis of fruits. In heavy infestation on pear tree the leaves become dry and fall.

*Cenopalpus lanceolatisetae* (Attiah)

*Brevipalpus lanceolatisetae* Attiah, 1956; Meyer, 1979.
*Cenopalpus lanceolatisetae* Pritchard and Baker, 1958; Zaher and Yousef, 1969; Yousef and Shehata, 1971; Jeppson, Keifer and Baker, 1975.
Records: Cyprus, Egypt, Greece, Iran, Libya, Portugal.
Hosts: *Pyrus communis* (pear), *P. malus* (apple), *Prunus armeniaca* (apricot), *P. domestica* (plum), *P. persica* (peach), *Punica granatum* (pomegranate).
New records: Dodekanisos (Kos, Rodos), Kriti (I-
raklion, Chania), Laconia, Samos on Cydonia oblonga (quince), Prunus insititia, apricot tree, pomegranate tree.

Relation to host: These mites are found on young shoots, buds and on both leaf surfaces.

Cenopalpus lineola (Canestrini and Fanzago)

Tetranychus lineola Canestrini and Fanzago, 1876.
Caligonus lineola Canestrini and Fanzago, 1878.
Tenuipalpus lineola Berlese, 1886; Berlese, 1887; Canestrini, 1889.
Brevipalpus kalandadzei Reck, 1951 (new synonymy).
Bevipalpus asyntactus Baker and Pritchard, 1952 (new synonymy).
Brevipalpus lineola Livshitz and Mitrofanov, 1967; Pegazzano, 1970-71.
Cenopalpus lineola Pritchard and Baker, 1958; Ehara, 1966; Jeppson et al., 1975.

Records: China, Greece, Holland, Italy, Japan, Poland, Portugal, Turkey, U.S.S.R.

Hosts: Pinus spp., P. halepensis, P. luchuensis, P. pallasiana, P. pinea, P. silvestris, Diospyros maritima.

New records: Argolis, Attiki, Drama, Evvia, Halkidiki, Korinthos, Imathia, Thessaloniki, Skiathos and Thasos on P. halepensis, P. nigra and P. pinea.

Relation to host: This mite is a pest of pine trees in Greece, and it causes drying of the needles.

Cenopalpus mespili (Livshitz and Mitrofanov)

Brevipalpus mespili Livshitz and Mitrofanov, 1967.

Hosts: Eriobotrya japonica (loquat), Pyrus malus (apple).

New records: Kavala, Magnisia, Pieria on apple.

Relation to host: This mite has been found in small populations on the ventral surface of the leaf.

Cenopalpus pennatisetis (Wainstein)

Brevipalpus pennatisetis Wainstein, 1958.
Cenopalpus pennatisetis Wainstein, 1960.

Records: Greece, Iran, U.S.S.R.

Host: Populus.

New records: Pieria, Viotia on Populus.

Relation to host: This mite has been found in small populations on both leaf surfaces.
Cenopalpus platani (Livshitz and Mitrofanov)

Brevipalpus platani Livshitz and Mitrofanov, 1967.
Records: Greece, U.S.S.R.
Host: Platanus.
New records: Attiki, Drama, Halkidiki, Kavala, Kilkis, Phthiotis, Thessaloniki, Viotia on Platanus sp. and Platanus orientalis.
Relation to host: Numerous mites are frequently found on the ventral side of the leaf near the base of the main rib, causing, apparently, slight damage.

Cenopalpus populi (Livshitz and Mitrofanov)

Brevipalpus populi Livshitz and Mitrofanov, 1967.
Records: Greece, U.S.S.R.
Host: Populus.
New records: Drama, Phthiotis, Viotia on Populus spp.
Relation to host: This mite is found in small populations on both leaf surfaces.

Cenopalpus pritchardi Dügünes

Cenopalpus pritchardi Dügünes, 1967.
Records: Greece, Iran, Turkey.

Host: Pyrus communis (pear).
New records: Evros, Kavala, Pella on P. amygdaloformis and P. malus.
Relation to host: This mite has been found in small populations on the ventral surface of leaves.
Cenopalpus pseudospinosus (Livshitz and Mitrofanov)

*Brevipalpus pseudospinosus* Livshitz and Mitrofanov, 1967.
Records: U.S.S.R., Greece (first recorded).
Host: *Rubus* (rasberry).
New records: Kastoria and Pella on raspberry.
Relation to host: This mite is found feeding on the underside of raspberry foliage.

*Cenopalpus pterinus* Pritchard and Baker

*Cenopalpus pterinus* Pritchard and Baker, 1958.
Records: Greece, Mallorca (Spain).
Hosts: *Adenostoma*, *Rosmarinium officinalis*.
New records: Greece (Attiki, Sounio, August 15, 1983) on *Pistacia terebinthus* and France (Montpellier, September 8, 1980) on *Adenostoma* sp.
Relation to host: This mite has been found in small populations on the leaves.

*Cenopalpus pulcher* (Canestrini and Fanzago)

*Caligonus pulcher* Canestrini and Fanzago, 1876; Canestrini and Fanzago, 1878.
*Tenuipalpus pulcher* Berlese, 1886; Canestrini, 1889.
*Tenuipalpus bodenheimeri* Bodenheimer, 1930 (new synonymy).
*Tenuipalpus oudemani* Geijskes, 1939; Sayed, 1942; Dosse, 1953 (new synonymy).
Brevipalpus oudemansi Sayed, 1946; Baker, 1949; Wainstein, 1956 (new synonymy).
Brevipalpus pyri Sayed, 1946; Baker, 1949 (new synonymy).
Brevipalpus ciferii Lombardini, 1951 (new synonymy).
Brevipalpus geisenheyneri Baker and Pritchard, 1952; André, 1954; Attiah, 1956 (misidentification).
Brevipalpus pulcher Baker, 1949; Livshitz and Mitrofanov, 1967; Meyer, 1979.
Cenopalpus pulcher Pritchard and Baker, 1958, Wainstein, 1960; Zaher and Yousef, 1969; Jepson, Keifer and Baker 1975.
Records: Algeria, Afghanistan, Austria, Bulgaria, China, Greece, Cyprus, Denmark, Egypt, England, Germany, India, Iran, Israel, Italy, Lebanon, Nederland, Portugal, Syria, Turkey, U.S.S.R. and Soviet Central Asia.
Hosts: Eriobotrya japonica (loquat), Cydonia oblonga (quince), Juglans regia (persian walnut), Prunus armeniaca (apricot), P. domestica (plum), P. persica (peach), Pyrus communis (pear), P. malus (apple), Salix (willow).

New records: This mite has been found throughout Greece on Amaranthus bletum, Citrus limon (lemon), E. japonica, C. oblonga, J. regia, Ficus carica (fig), Hydrangea macrophylla, Pistacia vera (pistachio), Prunus domestica, P. insititia, P. armeniaca, P. persica, P. avium (cherry), Pyrus communis, P. malus, Punica granatum (pomegranate), Syringa vulgaris (lilac), Vitis vinifera (grape).
Relation to host: This mite lives on the undersurface of the leaf along the midrib and leaf veins. It is important pest fo the apple, grape, quince, loquat and pear.

Cenopalpus ruber Wainstein

Cenopalpus ruber Wainstein, 1960.
Brevipalpus ruber Livshitz and Mitrofanov, 1967.
Records: Greece, U.S.S.R.
Hosts: Pyrus communis (pear), P. malus (apple).
New records: Imathia, Kozani, Pella on pear trees.
Relation to host: This mite has been found in medium populations on the ventral surface of leaves.

Cenopalpus spinosus (Donnadieu)
Tenuipalpus spinosus Donnadieu, 1875.
Brevipalpus spinosus Baker, 1949.
Tenuipalpus glaber Donnadieu, 1875.
Tenuipalpus geisenheyneri Rübsaamen, 1910; Ross and Hedicke, 1927.
Brevipalpus geisenheyneri Baker, 1949; Dosse, 1955.
Brevipalpus donnadieui Baker, 1949.
Cenopalpus spinosus Pritchard and Baker, 1958; Jeppson, Keifer and Baker, 1975.
Records: Germany, Greece, France, Iran, Monaco.
Hosts: Cornus (dogwood), Oenothera (primrose), Rosa (rose), Rubus (blackberry, dewberry, raspberry).
New records: France, in Antibes region, November 6, 1981, on Rubus. In Greece, this mite is distributed throughout the warmer and coastal regions of the mainland and islands on Rubus. In Attiki and Viotia it is found on roses.
Relation to host: This mite has been found in large populations on the ventral surface of leaves. It causes yellow or dark spots on the leaves of the rose.

Cenopalpus wainsteini (Livshitz and Mitrofanov)
Brevipalpus wainsteini Livshitz and Mitrofanov, 1967; Pegazzano, 1970-71; Meyer, 1979.
Cenopalpus fewstrei Zaher and Yousef, 1969; Wafa, 1968-69 (new synonymy).
Cenopalpus wainsteini Hatzinikolis, 1983.
Records: Egypt, Greece, Italy, U.S.S.R.
Hosts: Pinus spp., P. halepensis, P. pinea.
New records: Macedonia, Thraki, Attiki on Pinus sp., P. halepensis and P. pinea.
Relation to host: Infested pinus trees showed distorted and later dried needles.

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Αναθεώρηση του Γένους Cenopalpus στην Ελλάδα
(Acari: Tenuipalpidae)

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ΠΕΡΙΛΗΨΗ

Το γένος Cenopalpus αναθεωρείται και δίνεται ένα κλειδί για τα 17 ανευρεθέντα στην Ελλάδα είδη, με σχεδίαση των νυμφικών σταδίων. Δεκατρία είδη έχουν αναφερθεί στην Ελλάδα: C. eriobotryi Hatzinikolis, C. lanceolatisetae (Attiah), C. lineola (Canestrini και Fanzago), C. mespili (Livshitz και Mitrofanov), C. pennatisetis (Wainstein), C. platani (Livshitz και Mitrofanov), C. pritchardi Düzgünès, C. pterinus Pritchard and Baker, C. populi (Livshitz και Mitrofanov), C. pulcher (Canestrini και Fanzago), C. ruber Wainstein, C. spinosus (Donnadieu) και C. wainsteini (Livshitz και Mitrofanov). Τρία είδη αναφέρονται τώρα για πρώτη φορά στην Ελλάδα: C. bakeri Düzgünès, C. carpini (Livshitz και Mitrofanov) και C. pseudospinosus (Livshitz και Mitrofanov). Το νέο είδος C. arbuti περιγράφεται και εικονογραφείται. Δίνονται πληροφορίες της παγκόσμιας εξάπλωσης και ξενιστών των παραπάνω ακάρεων. Επίσης αναφέρονται οι ξενιστές, τα συμπτώματα προσβολής και η οικονομική σημασία των ανευρεθέντων ακάρεων στην Ελλάδα.