Mites of the family Tenuipalpidae (Berelese, 1913) are commonly known as false spider mites. They are minute, 0.20 - 0.32 mm in length, reddish plant feeders. Majority of species in this family are economically important pests of variety of crops. They generally infest the lower leaf surface usually near the veins and midrib. But some species feed on bark of plants, young twigs, floral heads, fruit surface, leaf sheaths and some from galls within which they feed and hide. As a result of their feeding, leaves are deprived of chlorophyll. Under severe infestation leaves become bronzed and fruits become rusty. A successive infestation of the tree for several years result complete death of the plant. They are mostly host specific.

**DIAGNOSIS OF THE FAMILY**

The family Tenuipalpidae belongs to the superfamily Tetranychioidea of prostigmatic mites. It can be differentiated from other families in the superfamily by the presence of simple, cylindrical palpus devoid of thumb claw complex on the terminal segment and often with reduced segmentation. Other characters of taxonomic importance are:

1. Stylophore with U-shaped needle like chelicerae;
Palpus simple 1-5 segmented, terminal segment with a rod like process, generally with 1-2 setae and lacks a claw.

ii. Dorsum ornamented with reticulations and striations. Rarely it is smooth. Chaetotaxy of the dorsum is of taxonomic importance. Propodosoma always possesses 3 pairs of dorsal setae. Hysterosoma shows 1-3 pairs dorsocentrals, one pair of humerals, 5-7 pairs of dorsolaterals and 1-4 pairs of dorsosublaterals or they may be lacking. First dorsosublateral when present is always above the humeral.

iii. Venter of propodosoma bears a pair of long medioventral setae associated with the bases of anterior coxae. The metapodosoma bears one to several pairs of medioventral setae on the ventral side. The opisthosoma of adult female bears a pair of medioventral setae usually set in a ventral plate and 1-3 pairs of anal setae located at anal plates.

iv. Female genitalia consist of a genital plate with 2 pairs of posterior setae. A Ventral platelet of varying shape, anterior to genital plate may be present or absent.

MORPHOLOGY

Dorsally body is divisible into two main parts:
(a) Gnathosoma (b) Idiosoma

GNATHOSOMA:— It bears two chelicerae, two palpi and mouth opening. Stylophore is constituted by the union of the cheliceral bases. Palpus is simple, without claw and terminal segment is provided with a sensory rod and usually 1-2 setae.

IDIOSOMA:— It can be differentiated into:

1. Rostral shield
2. Propodosoma
3. Hysterosoma

1. Rostral shield:— The anterior margin of propodosoma is modified into lobed projections called as the rostral shield. It is simple or wanting in different species.

2. Propodosoma:— It is the anterior portion of idiosoma and bears 3 pairs of setae and 2 pairs of eyes.

3. Hysterosoma:— The portion of idiosoma beyond the suture is called hysterosoma. It bears 9-13 pairs of setae.

Venter:— Ventral side is also ornamented with striations or reticulations. The metapodosomal venter usually bears 2 pairs of medioventral setae. Ventral shield with one pair of setae, genital shield with 2 pairs of setae (rarely one pair) and anal shield carries 1-3 pairs of anal setae.

Legs:— Four pairs in adults. Setal pattern is rather constant. A single sensory rod (solenidion) is always present at the distal end of tarsi 1st and 2nd but sometimes two solenidia may be present.
on one or both tarsi. The number of setae on genua 1st - 4th help
in specific identification. Claw bears several pairs of long
outer tenent hairs. The distal hook of claw is strongly developed,
reduced or lacking. Empodium-is pad like provided with two rows
of tenent hairs.

CLASSIFICATION

Pritchard and Baker surveyed the tenuipalpids of
California in 1951 and established the modern classification.
The classification is based on:

1. Presence or absence of certain body setae;
2. Number of palpal segments; and
3. Presence or absence of ventral plate.

This generic and specific classification was followed
by several authors and some of them also included the leg setation
and reticulate pattern found on the dorsum of these mites in the
classification. Pritchard and Baker (1958) proposed genus
Gonopalpus for those species of Brevipalpus which bear first pair
of dorsosublateral hysterosomal setae and the slender solenidia on
tarsi 1st and 2nd. Mitrofanov (1973a) segregated four new
genera as Hystripalpus, Pritchardipalpus, Brachypalpus and
Tenuipalpus on the basis of presence or absence of certain body
setae. He further sub-divided *Cenopalpus* into two subgenera namely *Cenupalpidae* and *Cenopalpus*. Meyer and many authors considered mere difference in the number of setae is insufficient for isolation and erection of genera. Baker *et. al.* 1975 again touched the subject and divided *Brevipalpus* into 7 species groups based on number of dorsolateral hysterosomal setae, number of setae on the palpus and number of setae on tarsus 2nd. All species under *Cenopalpus* are to be placed under *Brevipalpus* nov. Meyer 1979 followed this pattern of Baker *et. al.* (1975) in studying *Tenulipalpidae* of Africa and same pattern is utilized in this thesis.

There are 14 genera recognised in this family, 9 from them have been reported in India.

**GENUS - BREVIPALPUS (DONNADIEU 1875)**

**TYPE SPECIES - Brevipalpus obovatus (Donnadieu)**

It is a large genus and contains many species of economic importance. It is recognised by the following features:

i. Body oval shaped bearing reticulated skin;

ii. Distinct dorsal suture between propodosoma and hysterosoma in female;

iii. Four segmented palpus and rostral shield present;
ii. Dorsosublateral setae absent and 5-6 pairs of dorsolateral hysterosomals present;

v. Genital plate usually squarish or rectangular with a small anterior ventral plate;

vi. Legs with a pair of claws, pulvillus and tenent hairs.

Three species groups as Brevipalpus obovatus group, Brevipalpus spinosus group, and Brevipalpus phoenicis group were recognised during the present studies from this region. Six species of this genus have been so far reported from India.

**BREVIPALPUS OBOVATUS GROUP** :- The species in this group bear 5 pairs of dorsolaterals, 3 pairs of dorsocentral hysterosomals. Tarsus 2nd of female with a single short solenidion. A pair of anterior and a pair of posterior medioventral setae on the venter.

_Brevipalpus obovatus_ belongs to this group.

_Brevipalpus obovatus_ (Donnadieu 1875)

(plates - XIX & XXI)

_Brevipalpus obovatus_ Donnadieu, 1875, Histoire des tetranyques, 116;

_Brevipalpus inornatus_ (Banks), Attiah, 1956, Bull. Ent. Egypte, 440;
<table>
<thead>
<tr>
<th>Species</th>
<th>Author(s)</th>
<th>Publication Details</th>
</tr>
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<tbody>
<tr>
<td>Brevipalpus obovatus</td>
<td>Pritchard and Baker,</td>
<td>1958, Univ. Publ. Ent., 231;</td>
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<tr>
<td></td>
<td>Donnadieu</td>
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<td>Donnadieu</td>
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</table>

This species is being recorded for the first time from Jammu and Kashmir.

**FEMALE:**

**Colour:** Red

**Dimensions:** Body 265 μ long (excl. gnathosoma) 305 μ (incl. gnathosoma); 180 μ wide.

**Gnathosoma:** Palpus consists of four segments, 2nd segment with a seta, 3rd segment with 2 setae and the terminal segment bears a solenidion and 2 setae. Rostrum extends to the middle of femur 1st, rostral shield is bifurcate, pitted with one median and 3 lateral
well developed lobes on each side.

Dorsum: Eyes two pairs. Propodosoma and hysterosoma ornamented with reticulations fading away in the middle and laterally.

Propodosoma bears, 3 pairs of serrated setae varying in length; 1st and 2nd pairs measure 10 µ and the 3rd pair 8 µ.

Hysterosoma bears three pairs of dorsocentrals varying in length from 11-13 µ, 5 pairs of dorsolaterals measuring 9 µ, 9 µ, 9 µ, 9 µ and 6 µ in length respectively and a pair of numerals 8 µ long.

Venter: Anterior pair of medioventral metapodosomal setae are much shorter than a pair of long posterior medioventral metapodosomal setae. The latter being 58 µ and the former 9 µ long. Ventral shield is irregularly reticulated. Ventral plate bears one pair of setae, genital plate with two pairs of setae and one pair of anal setae are present. Genital shield is reticulated bearing genital setae longer than the ventral and anal setae.

Legs: Four pairs. Setae on the legs 1st-4th are: coxae 2-2-1-1; trochanter 1-1-1-1; femora 4-4-2-1; genua 3-3-1-1; tibiae 5-5-3-3. Setae on tarsi not clear. Tarsus 2nd with one solenidion, 20 µ long which is longer
than the segment on which it occurs.

**MALE:** Unknown.

**NYMPHA:**

**Dorsum:** It is provided with obscure striae and setae are mostly subspatulate.

**LOCALITIES AND HOST- RANGE**

**JAMMU:** Rubus niveus, Kishtwar, 4.X.1979; Morus alba, Poonch, 20.X.1979; Hibiscus esculentus, R.S.Pura, 14.X.1979; Napeta spicata (new host record), Rajuri, 22.X.1979; Napeta cataria (new host record), Budhal, 29.X.1979; Azadirach indica, (new host record), Poonch, 20.X.1979;

**HIMACHAL:** Vitis sp., Kulu, 12.IX.1977; Celtis australis, Simla, 5.IX.1977; Spiraea cantoniensis, Simla, 5.IX.1977; Desmodium sp., Simla, 5.IX.1977.

**ECONOMIC IMPORTANCE:** The mite infests mulberry, Dahlia, grapes, berry, Napeta and many other plants in this region. Leaves are bronzed and shrivelled due to desapping. About 30-40% leaves were seen infested in the field. The young seedlings were seen more infested and showed poor growth.
BIOLOGICAL NOTE: The mites were observed on both faces of leaf and on petioles in heavy infestations. High population density was seen in October on mulberry, which showed bronzed and collapsed foliage. The foliage of other plants was seen pale with faint brown specks on the upper surface. The predatory mites as Amblyseius insanus, Phytoseius mixtus and Amblyseius finlandicus were found predacious on this species in the field.

DISTRIBUTION

WORLD: U.S.A; Canada; France; Spain; Iran; Pakistan; Egypt; S.Africa; Newzealand; Australia; Japan; Argentina;

INDIA: Assam, H.P., South-India.

BREVIPALPUS SPINOSUS GROUP: This group is characterized by 6 pairs of dorsolaterals, one pair of dorsosublateral and 3 pairs of dorsocentral hysterosomal setae. One pair of anterior and one pair of posterior medioventral setae on the venter. Tarsus 2nd of female with a long solenidion.

Brevipalpus pulcher belongs to this group.
**Brevipalpus pulcher** (Canestrini and Fanzago 1876)

(Plates - XX & XXII)

<table>
<thead>
<tr>
<th>Species</th>
<th>Author/Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caligonus pulcher</td>
<td>Canestrini and Fanzago, 1876, Acad. Sci. Veneto - Trent.</td>
</tr>
<tr>
<td>Cenopalpus pulcher</td>
<td>(Canestrini and Fanzago), Pritchard and Baker, 1958, Univ. Calif. Publ. Ent. 194</td>
</tr>
<tr>
<td>Brevipalpus pulcher</td>
<td>(Canestrini and Fanzago), Baker et al. 1975, Smithson, contr. Zool., 194</td>
</tr>
</tbody>
</table>

This species is being recorded for the first time from Himachal Pradesh.

**FEMALE:**

**Colour:** Brick red.

**Dimensions:** Body 270 µ long (excl. gnathosoma), 320 µ (incl. gnathosoma); 170 µ wide.

**Gnathosoma:** A pair of setae is present ventrally. Palpus consists
of 4 segments, 2nd bears a serrate seta, 3rd two setae and the 4th three rod like solenidia. Rostrum does not reach the femur 1st, tapers distally and is pebbled.

**Dorsum:**
Eyes two pairs. Propodosoma and hysterosoma completely covered with a reticulate pattern, reticulations polygonal on propodosoma.
Propodosoma bears 3 pairs of long, serrate and tapering setae, varying in length; 1st and 2nd pair measure 11 µ and 3rd pairs 8 µ.

Hysterosoma with a pair of humeral, a pair of sublateral, 6 pairs of dorsolateral and 3 pairs of dorsocentral setae.

**Venter:**
Anterior pair of medioventral metapodosomal setae are much short (8 µ) than a pair of long (48 µ) posterior medioventral metapodosomal setae. A pair of ventral 14 µ long, two pairs of genital 10 µ long and a pair of anal setae are present.

**Legs:**
Four pairs. Setae on the legs 1st - 4th are:
Coxae 2-2-1-1; trochanter 2-2-2-1; Genua 3-3-1-1; tibiae 5-5-3-3; setae on tarsi not clear. Tarsus 2nd with a solenidion 19 µ long which is longer than the segment on which it occurs.

**M A L E :**
Dimensions: Body 239 µ long (incl. gnathosoma); 130 µ wide.
Dorsum: Oval shaped. The dorsolateral hysterosomals are much longer than the dorsolateral hysterosomals of female.

Nymphs:
Dorsum: The dorsal body setae are mostly subspatulate.

Third and 5th pairs of dorsolateral hysterosomals short, 2nd and 3rd pairs of dorsocentrals are minute, while other setae are long and identical.

Localities and Host-Ranges


Ladakh: Prunus pessica, Kargil, 11.IX. 1979;

Jammu: Prunus bokharensis (new host record), Mendhar, 17.X.1979; Prunus pumila, Bhaderwah, 8.X.1979, Poonch, 17.X.1979;


Economic Importance: The mite mostly infests the horticultural plants of family Rosaceae as apple, plum, quince and green-gage in
this region. Under severe infestations whole foliage of the trees was found infested in neglected orchards. The trees showed deformed foliage and gave weak appearance. Fruit was rusty, less in quantity and poor in quality. The mite population was seen very low in sprayed orchards.

BIOLOGICAL NOTE :- The mites were seen mostly on the undersurface of leaves, usually along the midrib and veins. In September, at 28.8°C maximum and 9.5°C minimum temperatures at Srinagar, 26.3°C at Kargil heavy mite populations were observed. About 70-100% foliage was found bronzed and shrivelled. Mites were also seen feeding on fruit surface usually near the fruit calyx. Heavily infested trees showed stunted, deformed and rusty fruits. Predators as stethorus and Adalia were seen actively feeding on these mites in orchards. Besides predatory mites as Typhloctonus volsella, Orientoseius hadii, Euseius vagnus, Phytoseius domesticus, Paraphytoseius multidentatus and Amblyseius insanus were found associated with this mite in the field. Anystis baccarum was seen feeding on these mites on apple trees.

DISTRIBUTION

WORLD :- Egypt; Algeria; U.S.S.R ; England; Denmark; Holland; Portugal; Australia; Iran; Germany; Turkey; Afghanistan;

INDIA :- Kashmir.
**BREVIPALPUS PHOENICIS GROUP** - The species of this group bear 5 pairs of dorsolateral and 3 pairs of dorsolateral and 3 pairs of dorsocentral hysterosomal setae. Tarsus II with two solenidia.

*Brevipalpus phoenicis* belongs to this group.

<table>
<thead>
<tr>
<th>Brevipalpus</th>
<th>Phoenicis</th>
<th>(Geijskes 1939)</th>
</tr>
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<tbody>
<tr>
<td>Tenuipalpus phoenicis</td>
<td>Geijskes, 1939</td>
<td>Meded. Land bonwh. Wageningen, 42: 230;</td>
</tr>
<tr>
<td>Brevipalpus phoenicis</td>
<td>(Geijskes)</td>
<td>Baker and Pritchard, 1960, Hilgardia, 29: 563;</td>
</tr>
<tr>
<td>Brevipalpus phoenicis</td>
<td>(Geijskes)</td>
<td>Gonzalez, 1975, Acarologia, 17: 82-91.</td>
</tr>
</tbody>
</table>
This species is being recorded for the first time from Jammu and Kashmir.

**DIAGNOSTIC CHARACTERS:** Reddish mite. Body 285 \(\mu\) long (incl. gnathosoma), 145 \(\mu\) wide. Body surface highly reticulate. Hysterosoma with five pairs of dorsolaterals, showing anterior median area aerolae and posterior median area reticulate. Humeral setae serrate and lanceolate. Hysterosomal pores are present. Tarsus 1st with one solenidion and tarsus 2nd with two solenidia.

**LOCALITIES AND HOST - RANGE**

JAMMU: Senecio sp., Udhampur, 24.X.1978;
Himachal: Senecio sp., Kulu, 12.IX.1977; Buddleia sp., Chehal, 8.IX.1977.

**ECONOMIC IMPORTANCE:** This mite was seen infesting ornamental plants in this region. Due to its feeding foliage looked pale greenish.

**BIOLOGICAL NOTE:** This mite was seen feeding on the both surfaces of leaves, mostly along the midrib and veins. High population density was seen in September in the field.

**DISTRIBUTION**

WORLD: England; Egypt; S.Africa; Newzealand; Mauritius; U.S.A;
Holland; Australia; Cuba; Brazil; Philippines;
Spain; Portugal; Taiwan; Syria; Italy; Kenya;
Argentina; Trinidad; Sicily;

**INDIA:**
Assam, Bihar, Karnataka, Orissa, Punjab, Tamil Nadu,
Maharashtra, Madhya Pradesh, Himachal Pradesh.

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**KEY TO SPECIES OF BREVIPALPUS**

1. Tarsus 2nd with two solenidia.
   Hysterosoma with 5 pairs of dorsolateral setae ....
   
   ... Brevipalpus phoenicis (Geijskes)

   Hysterosoma with 6 pairs of dorsolateral
   setae .................................................... 2

2. Propodosoma with large polygonal reticulations
dorsomedially .......... Brevipalpus pulcher (Can. and Fan.)

   Propodosoma devoid of reticulations dorsomedially.... 3

3. Tarsus 2nd with a single solenidion .................

   .................. Brevipalpus obovatus (Donnadieu).
GENUS - TENUIPALPUS  (DANNADIEU 1875)

TYPE SPECIES - Tenuipalpus caudatus Duges =
(T.palmatus Donnadieu)

It is the largest genus of family Tenuipalpidae, distributed throughout the world. It is recognised by the following characters:

i. Palpus with variable number of segments;
ii. Posterior margin of hysterosoma usually with a pair of long flagellate setae;
iii. Podosoma is distinctly broad and opisthosoma narrow;
iv. Genital and anterior ventral plates identical and generally fused to form a genitoventral plate.

Sixteen species of this genus have been so far reported from India. This genus is being recorded for the first time from Jammu and Kashmir.

Tenuipalpus pruni (Maninder and Ghai)


DIAGNOSTIC CHARACTERS: - Reddish mite. Body 284 μ long; 173 μ wide. Palpus 3 segmented, terminal segment with a solenidion.

Hysterosoma with 3 pairs of identical dorsocentral setae, 4 pairs of non flagellate and one pair of long flagellate caudolateral setae.
Tarsus 1st and 2nd with one solenidion. Venter bears simple setae.

LOCALITIES AND HOST - Range

JAMMU: _Prunus persica_, Bhaderwah, 28.VIII.1978;

HIMACHAL: _Prunus domestica_, Kulu, 12.IX.1977.

ECONOMIC IMPORTANCE: This species was collected from the leaves of peach and plum in the field. Mite population was low and no apparent damage was visible.

BIOLOGICAL NOTE: This mite was seen mostly along the midrib and veins of the foliage in the field. Population was low in August-September in the field. Predatory mite _Amblyseius largoensis_ was seen associated with this mite in the orchards.

DISTRIBUTION

PLATE XIX

EXPLANATION OF THE FIGURES

Brevipalpus obovatus (Donnadieu)

1. Shoots of Mulberry showing bronzed, shrivelled and collapsed foliage by feeding of Brevipalpus obovatus.

2. Injury to shoots of Desmodium sp. by Brevipalpus obovatus.
**Brevipalpus pulcher** (Can. and Fan.)

1. Branches of apple tree showing rusting on leaves and fruit. Fruit deformed on heavy infestation of *B. pulcher*.

2. Rusty patches on two varieties of apple caused by *B. pulcher*.
Brevipalpus obovatus (Donnadieu)

1. Dorsum of female.
2. Venter of female.
3. Dorsum of nympha.
4. Tarsus 2nd (♀).
5. Palpus (♀).
6. Rostral shield (♀).
PLATE XXII

EXPLANATION OF THE FIGURES

Brevipalpus pulcher (Canestrini & Fanzago)

1. Dorsum of female.
2. Venter of female.
3. Rostral shield (Q).
4. Dorsum of Male.
5. Dorsum of nympha.
6. Palpus (♀).
7. Tarsus 2nd (♀).