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Acarologia, CBGP, CS 30016, 34988 MONTFERRIER-sur-LEZ Cedex, France
ISSN 0044-586X (print), ISSN 2107-7207 (electronic)

The digitalization of Acarologia papers prior to 2000 was supported by Agropolis Fondation under the reference ID 1500-024 through the « Investissements d’avenir » programme (Labex Agro: ANR-10-LABX-0001-01)

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THREE NEW SPECIES OF THE GENUS CHELETOGENES OUDEMANS (ACARINA : CHEYLETIDAE) FROM PAKISTAN

by G. Mustafa AHEER *, Shamshad AKBAR ** and W. M. CHAUDHRI***

Thirteen new species of the genus Cheletogenes i.e. C. sagacis, C. iconis and C. carinatus have been described. A key to Pakistan species has been prepared. Phenetic affinities of the species, so far, known from the world, has been prepared.

The genus Cheletogenes was erected by Oudemans in 1905 and Cheyletus ornatus (C. & F.) was designated as type species. Volgin (1969) created a new genus Prosocheyle and shifted 5 species, known till then, from genus Cheletogenes to Prosocheyle, leaving only ornatus in the genus Cheletogenes. Summers and Price (1970) reviewed the family Cheyletidae and redescribed the only species in the genus. Tseng (1977) described a new species—Cheletogenes monosetosus. Qayyum and Chaudhri (1977) described 2 new species—C. scaber and C. petiginis; Rasool and Chaudhri (1979) described C. vulgatus, new species. Akbar, Rahi and Chaudhri (1988) described C. dissitus, new species from Pakistan.

The authors have now described 3 new species in this genus from Pakistan thus making a total of 9 species in this genus. A key to all the 9 species has also been prepared and phenetic affinities have been discussed.

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Acarologia, t. XXXIII, fasc. 1, 1992.
Palp-claw with less than 11 teeth; coxae I-IV with 2-1-2-2 setae; femora I-IV with 2-2-2-1 setae. 8
8. Palp-claw with 10 teeth; tarsi I-IV with 5-5-5-5 setae. C. petiginis Qayyum & Chaudhri
Palp-claw with 9 teeth; tarsi I-IV with 5-8-7-7 setae. C. scaber Qayyum & Chaudhri

Cheletogenes iconis, new species
(Fig. 1 A-E)

Female: Body 302 \( \mu m \) long, 260 \( \mu m \) wide. Ros­
trum exposed part 10 \( \mu m \) long, superior and infe­
rior dorso lateral face, striations in front, 1 fan-
lke, 1 spatulate and 2 simple setae. Palp-tasurs
with 2 comb-like, 2 sickle-like and 1 minute soleni-
dion. Palp-claw with 15 teeth. Outer and inner
combs with 24 and 28 teeth, respectively. Protomen 31 \( \mu m \) long with whorls of
striations and a slight notch mid-anteriorly. Teg-
men 44 \( \mu m \) long with 3 whorls of striations. Palp-
femur robust, 4 cancellate areas of muscle attach-
ment on dorsolateral face, striations in front, 1 fan-
like, 1 spatulate and 2 simple setae. Palp-tasurs
with 2 comb-like, 2 sickle-like and 1 minute soleni-
dion. Palp-claw with 15 teeth. Outer and inner
combs with 24 and 28 teeth, respectively. Peritreme with 8 links on each side, last link curves sharply
towards mid-line. Eyes rounded, 1 pair, 1 on each
day. Dorsal setae 17 pairs, fan-shaped, all similar,
each seta having a small pedicel and scale-like blade
with about 13 coarsely barbed ribs (Fig. 1 E). Propo-
dosomal shield well defined, almost covering propodosomal area, papillae on the shield, 4 pairs
lateral and 4 pairs median setae. Hysterosomal
shield ill defined, 2 pairs median setae on the shield,
6 pairs lateral and 1 pair humeral setae on mem-
bane (4 pairs setae posterior to hysterosomal
shield arranged in longitudinal row) (Fig. 1 A).
Membranous area with twisted strings or rope,
rising in different directions (Fig. 1 A).

Legs I-IV measuring (trochanter base to tarsus
tip) 148 \( \mu m \), 135 \( \mu m \), 143 \( \mu m \) and 159 \( \mu m \) in length,
respectively. Length ratio: leg I/idiosoma = 0.49;
leg I/leg II = 1.09. Setae and solenidia on legs
segments: Coxae 2-1-2-2, trochanters 1-1-1-1,
femora 2-2-2-1, genua 3-2-2-2, tibiae 5-4-4-4, tarsi
5-8-7-7. Tarsus I short, truncate at distal end;
pretarsus and pedicel lacking; 2 long adorsal setae
tc on its blunt end; 1 pair ventral microsetae in
subapical position; solenidion wi very short, on a
minute nipple, guard seta absent (Fig. 1 C). Pregen-
nal setae 1 pair, very long, simple. Paragenital
setae 3 pairs, simple. Genital setae 2 pairs, simple.
Anal setae 3 pairs, all simple (Fig. 1 D).

Male: Not known.

Type: Holotype female, collected 3 km. S.
Multan from cotton (Gossypium hirsutum) on 29.
IX.1980 (AHEER, AKBAR and CHAUDHRI) and depo-
sited in Acarology Research Laboratory, Depart-
ment of Agric. Entomology, University of Agriculture,
Faisalabad, Pakistan.

Remarks: This new species can be separated
from all the species, so far, described in this genus
on the basis of 17 pairs of dorsal setae and 3 pairs
of paragenital setae.

Cheletogenes sagacis, new species
(Fig. 2 A-E)

Female: Body 281 \( \mu m \) long, 260 \( \mu m \) wide. Ros-
trum exposed part 10 \( \mu m \) long, superior and infe-
rior dorso lateral face, striations in front, 1 fan-
lke, 1 spatulate and 2 simple setae. Palp-tasurs
with 2 comb-like, 2 sickle-like and 1 minute soleni-
dion. Palp-claw with 16 teeth; outer and inner
combs with 20 and 30 teeth, respectively. Peritreme with 9 links on each side, last 2 links curve sharply towards midline. Eyes rounded, 1 on each side. Dorsal setae
16 pairs including 1 pair humeral setae, all alike,
fan-shaped; each seta having a small pedicel and a
scale like blade with about 12 coarsely barbed ribs
(Fig. 2 E). Propodosomal shield well defined, cover-
ing almost all the propodosoma, 4 pairs lateral and
3 pairs median setae; shield with papillae. Hystero-
somal shield ill-defined with 2 pairs median setae
on shield, six pairs lateral and 1 pair humeral setae
on membrane (4 pairs posterior in position to
shield, arranged in longitudinal row) (Fig. 2 A).
Membranous area with broken, wavy striations
FIG. 1: Cheletogenes iconis n. sp.
(Scale bar of D = 25 μm).
FIG. 2: Cheletogenes sagacis n. sp.
running in different directions as shown in figure 2 A.

Legs I-IV measuring (trochanter base to tarsus tip) 125 µm, 117 µm, 101 µm and 138 µm in length. Length ratio : leg I/idiosoma = 0.44 ; leg I/leg II = 1.06. Setae and solenidia on leg segments : Coxae 1-1-1-2, trochanters 1-1-1-1, femora 2-2-2-1, genua 2-2-2-2, tibiae 5-4-4-4, tarsi 5-8-7-7. Tarsus I short, truncate on distal end ; pretarsus and pedicel lacking ; 2 long addorsal setae tc on its blunt end ; 1 pair ventral microsetae in subapical portion ; solenidion wi very short, 8 µm long, set on a prominent nipple ; guard seta absent (Fig. 2 D). Pregenital, paragenital and genital setae 1 pair, 2 pairs and 2 pairs, respectively. Anal setae 3 pairs, 1 serrate, 2 simple (Fig. 2 D).

**MALE : Not known.**

**TYPE :** Holotype female, collected 2 km. N. Haripur from undet. host plant No. 8/81 on 19.v. 1981 (AHEER, AKBAR and CHAUDHRI) and deposited in Acarology Research Laboratory, Department of Agric. Entomology, University of Agriculture, Faisalabad, Pakistan.

**REMARKS :** This new species is closely related to Cheletogenes carinatus, n. sp. due to many characters, however the following points separate these two species :

1. Peritreme with 8 links on each side in carinatus but 9 links on each side in this new species.
2. Palp-claw with 12 teeth in carinatus as against 16 teeth in this new species.
3. Dorsal setae 15 pairs in carinatus but 16 pairs in this new species.
4. Coxa I with 2 setae in carinatus as against 1 seta in this new species.

**Cheletogenes carinatus, new species**

(Fig. 3 A-E)

**FEMALE :** Body 260 µm long, 234 µm wide. Rostrum exposed part 10 µm long, superior and inferior adoral setae, each 1 pair, 5 µm and 10 µm long, respectively. Protegmen 29 µm long with whorls of striations and a very slight notch mid-anteriorly. Tegmen 44 µm long, ornamented with whorls of broken striations directed medially. Pulp-femur robust, 3 cancellate areas of muscle attachment on dorsolateral face, striations in front, 1 fan-like, 1 spatulate and 2 simple long setae. Palp-tarsus with 2 comb-like, 2 sickle like setae and 1 minute solenidion. Palp-claw with 12 teeth. Outer and inner combs with 22 and 28 teeth, respectively. Peritreme with 7 links on each side, 2 posteriormost links curve sharply towards mid-line. Eyes rounded, 1 on each side. Dorsal setae 15 pairs including 1 pair humeral setae, all fan shaped, each seta having a small pedicel and a scale-like blade with about 15 coarsely barbed ribs (Fig. 3 E). Propodosomal shield well defined with papillae, 4 pairs lateral and 3 pairs median setae. Hysterosomal shield not well defined, 2 pairs median setae. Five pairs lateral and 1 pair humeral setae on membrane (Fig. 3 A). Legs I-IV measuring (trochanter base to tarsus tip), 133 µm, 122 µm, 130 µm and 138 µm in length, respectively, Length ratio leg I/idiosoma = 0.5 ; leg I/leg II = 1.09. Setae and solenidia on legs I-IV : Coxae 2-1-1-2, trochanters 1-1-1-1, femora 2-2-2-1, genua 2-2-2-2, tibiae 5-4-4-4, tarsi 5-8-7-7. Tarsus I short, truncate on distal end ; pretarsus and pedicel lacking ; 2 long addorsal setae tc on its blunt end ; 1 pair ventral microsetae in subapical portion ; solenidion wi very short, on nipple, 10 µm long ; guard seta absent. Pregenital, paragenital and genital setae 1 pair, 2 pairs and 2 pairs, respectively. Anal setae 3 pairs, 1 serrate. One pair post-anal setae, serrate (Fig. 3 D).

**MALE : Not known.**

**TYPE :** Holotype female, collected 1 km E. Pirmahal from grapes (Vitis vinifera) on 5.IX.1980 (AHEER, AKBAR and CHAUDHRI) and deposited in Acarology Research Laboratory, Department of Entomology, University of Agriculture, Faisalabad, Pakistan.

**REMARKS :** This new species is closely related to Cheletogenes sagacis due to most of the body characters but the following points separate these two species :

1. Peritreme with 9 links on each side in sagacis but 8 links in this new species.
2. Palp-claw with 16 teeth in sagacis but 12 teeth in this new species.
Fig. 3: Cheletogenes carinatus n. sp.
3. Dorsal setae 16 pairs in *sagacis* as against 15 in this new species.

4. Coxa I with 1 seta in *sagacis* as against 2 in this new species.

**DISCUSSION**

The phenogram of the species of the genus *Cheletogenes* (Tables I-II, Fig. 4) depicts an interesting clustering of the taxa involved. The highest linkage (80%) is recorded between the *scaber* and *petiginis* pair, as both these have been collected from the plain areas and their similarity could well be attributed to similar ecological habitats. In the second cluster, the taxa *sagacis* has an affinity of 80% with *carinatus* (in pair) whereas species *ornatus* and *iconis* join this pair, successively at 75% and 66.66% levels of affinity. The species of this cluster are from varied singular localities and inhabit diverse ecological zones of mountains and plains. This cluster shows an affinity of 65% with *scaber-petiginis* pair which could be an attribute of genetics rather than ecological relations. Further the species *vulgatus* from arid plains shows an affinity of 55% with the above said cluster, whereas the species *dissitus* and *monosetosus*, both from far off localities, show an affinity of 36.5% and 32.5%, respectively, with all the rest of the compared taxa.

In spite of the fact that the species of this genus have been collected from discrete localities and are dwellers of diverse ecological habitats yet they show a high degree of phylogenetic affinity with each other. This indicates that the similarity could be an attribute of genetics. It also behoves that species despite a common ancestral source, have a greater adaptive amplitude for different ecological habitats.

**TABLE I : Comparison of characters in species of genus Cheletogenes Oudemans.**

<table>
<thead>
<tr>
<th>Character</th>
<th>vulgatus</th>
<th>scaber</th>
<th>petiginis</th>
<th>ornatus</th>
<th>sagacis</th>
<th>carinatus</th>
<th>iconis</th>
<th>dissitus</th>
<th>monosetosus</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Peritreme with 6 links on each side</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2. Palp-femur with cancellate area</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>3. Palp claw with 11 teeth</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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</tr>
<tr>
<td>4. Outer comb with 18 teeth</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<tr>
<td>5. Inner comb with 22 teeth</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6. Propodosomal shield with 4 pairs lateral setae</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>7. Propodosomal shield with 3 pairs median setae</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>8. Hysterosomal shield with 2 pairs median setae</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>9. Dorsal setae 16 pairs including humeral setae</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>10. 3 pairs setae posterior to hysterosomal shield</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>11. Posterior setae in longitudinal row</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>12. Leg II / idiosoma = 0.5</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>13. Coxae I-IV with 2-1-2-2 setae</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>14. Trochanters I-IV with 1-1-1-1 setae</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>15. Femora I-IV with 2-2-2-1 setae</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>16. Genua I-IV with 3-2-2-2 setae</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>17. Tibiae I-IV with 5-4-4-4 setae</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>18. Tarsi I-IV with 5-8-7-7 setae</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>19. 2 pairs of genital setae</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>20. 2 pairs paragenital setae</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>
Table II: Matrix showing percentage of similarity in species of genus *Cheletogenes* Oudemans.

<table>
<thead>
<tr>
<th></th>
<th>vulgatus</th>
<th>scaber</th>
<th>petiginis</th>
<th>monosetosus</th>
<th>ornatus</th>
<th>sagacis</th>
<th>carinatus</th>
<th>iconis</th>
<th>dissitus</th>
</tr>
</thead>
<tbody>
<tr>
<td>vulgatus</td>
<td>xx</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>scaber</td>
<td>50</td>
<td>xx</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>petiginis</td>
<td>60</td>
<td>80</td>
<td>xx</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>monosetosus</td>
<td>30</td>
<td>55</td>
<td>55</td>
<td>xx</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ornatus</td>
<td>65</td>
<td>65</td>
<td>65</td>
<td>50</td>
<td>xx</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>sagacis</td>
<td>50</td>
<td>70</td>
<td>60</td>
<td>55</td>
<td>75</td>
<td>xx</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>carinatus</td>
<td>50</td>
<td>60</td>
<td>70</td>
<td>55</td>
<td>75</td>
<td>80</td>
<td>xx</td>
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<tr>
<td>iconis</td>
<td>55</td>
<td>65</td>
<td>65</td>
<td>30</td>
<td>70</td>
<td>65</td>
<td>75</td>
<td>xx</td>
<td></td>
</tr>
<tr>
<td>dissitus</td>
<td>35</td>
<td>65</td>
<td>60</td>
<td>60</td>
<td>45</td>
<td>50</td>
<td>50</td>
<td>60</td>
<td>xx</td>
</tr>
</tbody>
</table>

The species *scaber* and *petiginis* as well as *sagacis* and *carinatus* are in pairs and show an affinity up to 80% which is indicated in two different lumps. This would imply the character plasticity of these species. Hence the diagnostics are elaborated by virtue of showing most of the characters (apomorphy) by the different groups among themselves.

The evident conclusions for these four taxa could well be, that two pairs (*scaber-petiginis* and *sagacis-carinatus*) have come from different sources. Further, the cluster of the species (*sagacis, carinatus, ornatus* and *iconis*) tend to be closer to the ancestral line.

**LITERATURE CITED**

**AKBAR (S.), RAHI (M. S.) and CHAUDHRI (W. M.), 1988.** — Three new mite species of the family Cheyletidae from Pakistan. — Fla. Ento., 71 (1) : 1-7.


![Fig. 4: Phenogram of species of genus *Cheletogenes* Oudemans.](image-url)
RASOOL (A.) and CHAUDHRI (W. M.), 1979. — Description of a new species of the genus Cheletogenes Oudemans (Cheyletidae) from Pakistan. — Pak. Entomol., 1 (2) : 2-7.


