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Two new species of *Tarsonemus* (Acari: Prostigmata) associated with *Xylocopa* carpenter bees (Hymenoptera: Apoidea)

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(With 18 figures)

Abstract

Two new species: *Tarsonemus platynopodae* and *Tarsonemus xylocopae* n. spp. are described and illustrated. Their systematic position and some conclusions on biology are briefly discussed.

A new group of species among the genus *Tarsonemus* is established.

Methods

Specimens of both species were found during collecting materials for a study *Sennertia spp.* and other acarofauna associated with *Xylocopa* the carpenter bee. Parts of wood with *Xylocopa* nests were removed, cleaved and brushed out for mites presence. Some bee-cells were put into Berlese funnels for more mite meterials.

Mites were mounted on slides in Berlese medium, and examined with Zeiss interference contrast microscope (Nomarski).

Applied nomenclature for idiosomal and legs setation is based on the papers of LINDQUIST (1978) and KALISZEWSKI (1984).

Description

Tarsonemus xylocopae group

Members: *Tarsonemus xylocopae, Tarsonemus platynopodae* n. spp.

Diagnosis (Female): Gnathosoma oval, slightly elongated at its end with approximate palpi constituing short snout. Postpalpal setae absent. Idiosoma oval, setae c_1, c_2 attenuated, setae d, e, and f short, stouter, setae h apparently longer than former, tapered. Transverse apodeme well developed, tegula short, no wider than 2.5 times of trochanter IV width. Claws relatively strong, hooklike; empodia of legs II-III striated. On all tarsi one simple seta lacking (in relation to normal basic setae complete for *Tarsonemus*). Spine Ta II pl" absent. On leg IV subapical seta tc" apparently no stronger than v'G and v'F.

Male: Gnathosoma similar to that of female. Idiosoma elongated. Setae f longer than d and subequal to c_1. Claws less strong than that of females, empodia also striated. Leg IV about 1.5 time larger than III.

Tarsonemus xylocopae sp. n. (Figs. 1-6)

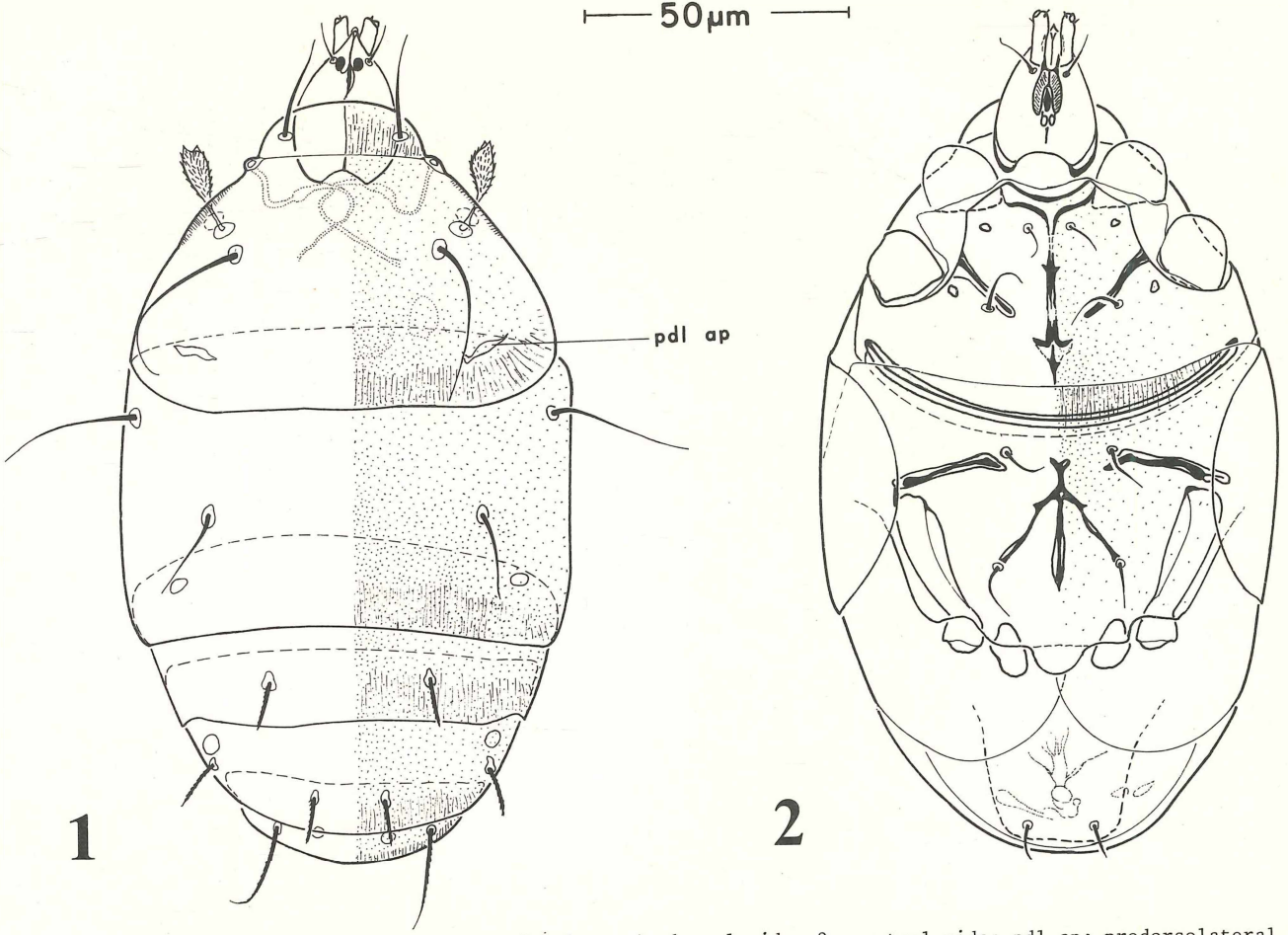
Female: body length 158 (148-202) (dimensions of holotype are given first, dimensions among five paratypes in parenthesis, all measurements in µm), body width 87.

Gnathosoma (Figs. 1 and 2): oval shaped, conical anteriorly, 32 (29-36) long, 20 (18-25) wide. Palpi cylindrical, moderately long and large, snoutlike, approximate, located on the apex of gnathosomal capsule,directed anteriorly,more or less parallely. Each palpus with distinct small process and two minute palpal setae. Chelicerae thin, small,fully retractable; their basal levers also small, each 3 (3-4) long. Pharynx 11 (9-13) long, 5 (4.5-5) wide, (i.e. slightly wider than one-fourth of posterial gnathosomal width). Dorsal gnathosomal setae weak, subequal to ventral ones; postpalpal pair of setae absent.

Idiosoma, dorsal side (Fig. 1): elongated, ellipsoidal 135 (121-160) long, finely granulated. Prodorsal shield subtrapezoidal, little less than 1.3 time as wide as long. Its anterior part (rostral shield, naso) formed as a broad, subcircular, weakly striated lobus, covering normally about half of the length of gnathosoma; it is about three times wider (segment between stigmae) than long medially (from apex to the medium of segment between stigmae). Posterior edge of prodorsal shield straight; its lateral edges arch-like, weakly striated.

Longitudinal relations of dorsal setae: 1 : 1.55 : 1.2 : 0.9 : 0.5 : 0.5 : 0.5 : 1 (v_1 : Sc_2 : c_1 : c_2 : d : e : f : h). Vertical setae v_1 20 (20-22) long, smooth, tapered, located anteriorly to stigmae, 22 (20-22) apart. Stigmata located on weakly defined processes of prodorsal shield; tracheal trunks slightly extended in its medial part. Sensilli Sc_1 18 (15-18) long, capitate, pilose, double sharply ended, with pediceles covered by edges of prodorsal shield. Scapular setae Sc_2 [31 (27-31) long] shorter than distance between its insertations [38 (36-40)]. Prodorsomedial apodeme absent, prodorsolateral apodemes weakly defined. Setae c_2 on tergite C 24 (20-25) long, inserted 81 (76-83) apart, about 1.5 time longer than c_1 (18 (14-18) long, inserted 54 (45-54) apart, and 23 (22-25) next to c_2). Both pairs of setae smooth, slender, tapered. Setae d on tergite D, e and f on tergite EF subequal in length, delicately barbed, untapered, stiff, sharply ended: d 10 (9-10), e 10 (8-10) and f 10 (9-10) long, located d-d 31 (27-29), and f-f 14 (11-14) apart respectively. Setae h on tergite H tapered, barbed, slender, twice as long [20 (18-20)] as f, located 31 (27-31) apart. All idiosomal tergites weakly,sparsely granulated, with posterior margins slightly striated.

Ventral side (Fig. 2): Propodosomal plate 49 (43-49) long, 78 wide posteriorly, visibly concave anteriorly between ends of a apodemes I, broadly arch-like convex posteriorly, with an angularity between ends of apodemes I and II. Apodemes I strong; its anterolateral ends divided by the distance of 18



Figs. 1, 2: *Tarsonemus xylocopae* sp. n., female. - 1: dorsal side; 2: ventral side; pdl ap: prodorsolateral apodeme.

(16-18), two times shorter than the same distance of apodemes II. Apodemes II with anterolateral ends divided by distance of 36 (34-39), conspicous, not uniting with anteromedian apodeme. Anteromedian apodeme connected anteriorly with apodemes I, with conspicuous nodule in midlength of distance between medial ends of apodemes I and II. Posterial part of anteromedian apodeme consists of anchor shaped nodule and separated short, little stronger segment.

Transverse apodeme broad, equally thick along its length. Coxal setae 1a 5 long, located 7 (6-7) apart, conspicuously posteriad of apodemes I. Coxal setae 2a 9 (9-10) long, located 6 (4-6) apart, slightly posteriad of medial one-third of apodemes II. Apodemes III do not extend laterally beyond anterior extremities of trochanters III. Apodemes IV connected with posteromedian apodeme into bell shaped complex; curved with small nodules in anteromedian part with posterolateral extremities reaching points of location of coxal setae 3b. Posteromedial apodeme little bifurcated anteriorly ending near the level of coxal setae 3a and posteriorly extending slightly beyond the level of setae 3b. Coxal setae 3a 11 (9-11) long, equal in length to 3b.

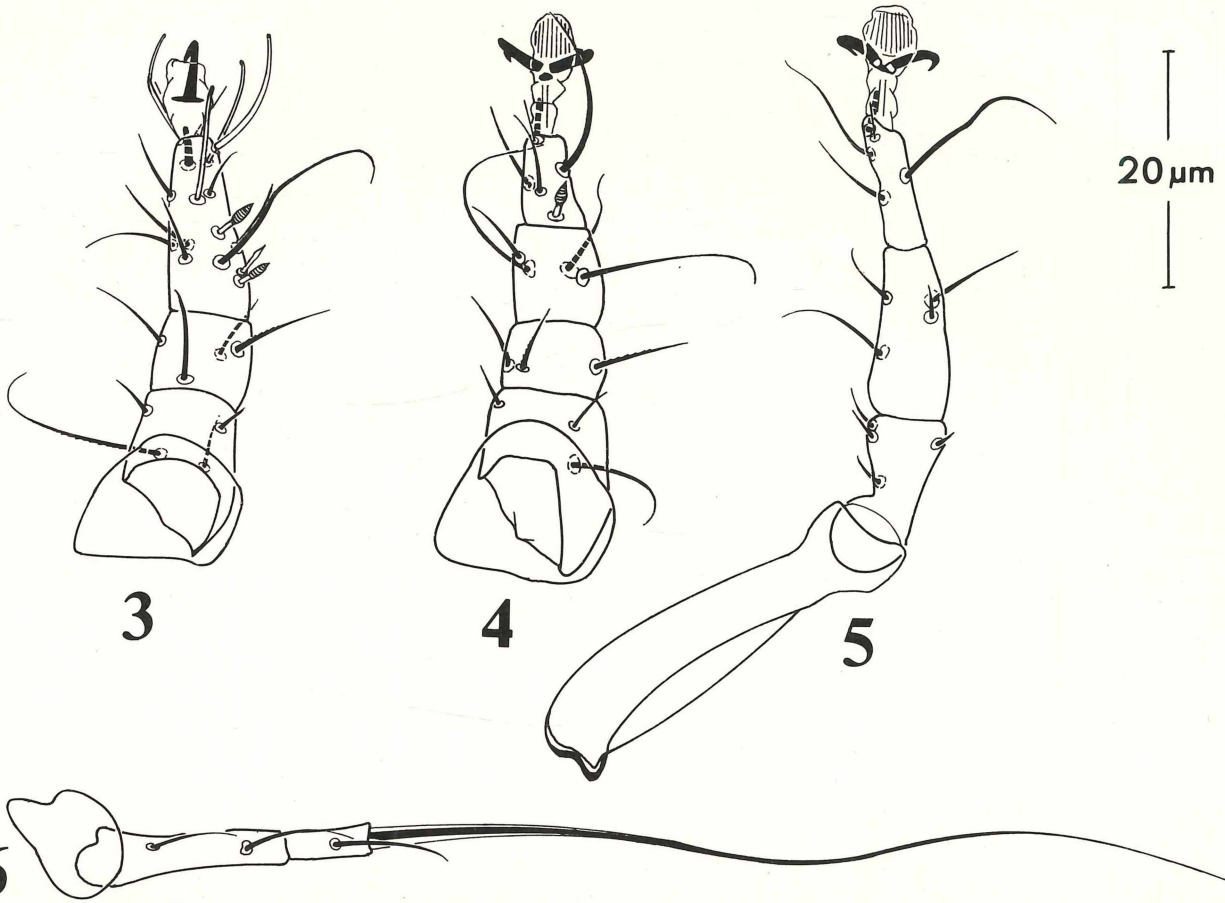
Posterior edge of metapodosomal plate broadly waved, with small tegula, little shorter ⌈6 (4-6)⌋ than wide ⌈9 (9-10)⌋. Distance between trochanters IV 2 time as long as their width.

Lateral genital plates close, just overlapping one another. Median genital plate covers PS segement; setae ps 5 (4-6) long, located 13 (10-13) apart. All ventral setae smooth, tapered. Ventral side covered by weak, very fine granulation, slightly increasing to the transverse midline of the body.

Legs (Figs. 3-6): Longitudinal relations of legs: 1 : 1.1 : 1.1 : 0.6 (I : II : III : IV). Leg I only little shorter than legs II and III, leg IV (without trochanter and apical seta) two times shorter than legs II and III.

Leg I chaetotaxy: 4-4-6 ($1\phi_1$) + 7 (1ω). Pretarsus of leg I of normal proportions, with one normally developed slightly elongated claw. Two minute setae u' and u'' flanking pretarsi are omitted in chaetotaxy due to their indiscernibility (after LINDQUIST 1978, KALISZEWSKI & MAGOWSKI 1985). Among four tarsal I eupathids two (p, p'') are inserted apically on tibiotarsus, one (tc'') in one-fifth of tibiotarsus length near the apex of segment, and one (tc') in one-third of tbt length from apex. Subunguinal seta s of all legs spinelike. Tarsal solenidion ωI 5 (4-5) long, capitate, with spiculate apex, tibial solenidion ϕ_1 4 (3-4) long, capitate and spiculate as well. The second tibial solenidion ϕ_2 absent, eupathid k small, short, sharply ended. Genual seta l pilose; femoral seta v'' as long as tibiotarsus; other femoral setae short, thin, stiff.

Leg II chaetotaxy: 3-3-4-4 (1ω). Pretarsus II with moderately large, striated empodium and two well developed and stronger than typically for *Tarsonemus* hooklike claws. One unguinal seta u'' present. Tarsal II solenidion ω 5 (4-5) long, with spiculate ended head; tarsal spine pl'' absent. Pretarsus of leg II subequal or slightly longer than tarsus. Genual



Figs. 3-6: *Tarsonemus xylocopae* sp. n., female. - 3: leg I; 4: leg II; 5: leg III; 6: leg IV.

seta l' slender; l'' stiffer, as long as the width of genu II; both setae with delicate pilosity. Femoral seta l' short, stiff.

Leg III chaetotaxy: 1+3-4-4. Pretarsus III with moderately large, striated empodium and two strong claws (similar to those of leg II). One unguinal seta u'' present, slender. Pretarsus subequal in length to tarsus III. Femurogenual setae of leg III short, minute.

Leg IV 25 (23-25) long (without trochanter); femurogenu IV 18 (16-18) long (i.e. 2.5 times as long as tibiotarsus IV which is 7 long). Femurogenual setae v'G and v'F thin, slender, 9 (7-9) long. Tibiotarsal seta tc'' unusually formed for *Tarsonemus:* thin, slender, only little longer than its segment [11 (9-11)]. Apical seta v' Ti also unusually thick at its base (nearly as whole segment) more than three times longer than all leg IV (without trochanter), and two times shorter than entire idiosoma [67 (63-72) long].

Male and larva unknown.

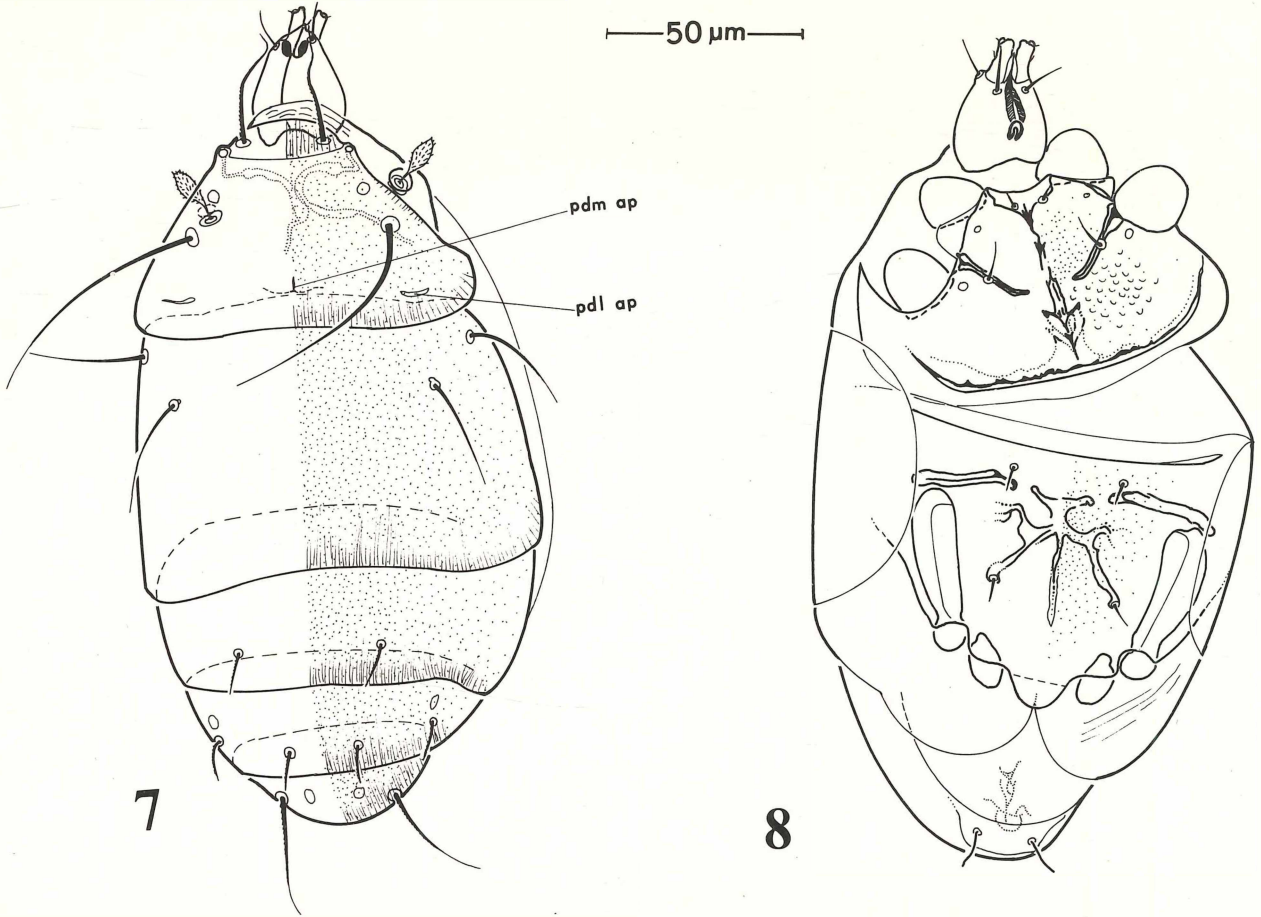
Tarsonemus platynopodae sp. n. (Figs. 7-18)

Female: body length 202 (dimensions of holotype - the first, dimensions of one female paratype second, in parenthesis; doubtful dimensions of paratype marked by question mark), body width 110.

Gnathosoma (Figs. 7 and 8): oval shaped, slightly rectangular anteriorly, 32 (36) long, 23 (25) wide. Palpi cylindrical, relatively long, approximate, located parallel to each other, on the anterior extremity of gnathosomal capsule, directed forward. Each palpus with two minute palpal setae and small process distally. Chelicerae thin, minute, fully retractable; cheliceral levers 4 (5) long each, located close, little rectilinearly each other. Pharynx 13 (9) long and 5 (5) wide, with weakly sclerotized and striated walls. Posteriad of main part of the pharynx two small not fused glandular structures. Dorsal and ventral gnathosomal setae slender thin, subequal in length.

Idiosoma, dorsal side (Fig. 7): elongated, ellipsoidal shaped, 166 long, weakly granulated. Prodorsal shield subtrapezoidal, with rostral shield (naso) broadly circular, weakly striated anteriorly, about 4 times wider (segment between stigmae) than long medially (from apex to the medium of the segment between stigmae).Lateral and posterior margins of prodorsal shield more or less straight. Prodorsal shield about 1.6 time as wide posteriorly as long medially. Tracheal trunks normally developed, with delicately striated extensions in its medial segments. Prodorsolateral apodemes small but visible, prodorsomedial apodeme weakly defined, inconspicuous.

Longitudinal relations of setae on dorsum: 1 : 2.3 : 1 : 0.8 : 0.3 : 0.3 : 0.3 : 1. Vertical v_1 setae tapered, very finely barbed 27 (23) long, located 20 (20) apart, i.e. in



Figs. 7, 8: *Tarsonemus platynopodae* sp. n., female. - 7: dorsal side; 8: ventral side; pdm ap: prodorsomedial apodeme; pdl ap: prodorsolateral apodeme.

distance about 0.7 of their length. Sensilli 14 (18) long, capitate, with distinct pedicele, pilose, truncated (or slightly double spiculate). Scapular setae sc_2 63 (31 ?) long, located 54 (41 ?) apart i.e. in distance of 0.9 of their length. Setae c_2 on tergite C 27 (20) long, divided by distance of 81 (85); setae c_1 23 (16) long, located 63 (60) apart, and 18 (27) each next to c_2. Both of pairs on tergite C smooth, slender. Setae d on tergite D, e and f on tergite EF stiff but weak, very delicately barbed (d 9 (9) long located 36 (31) apart, e 9 (9) long as well, and f 8 (7) long, located 16 (14) apart). Setae h on tergite H slender, tapered, slightly delicately barbed, 27 (18 ?) long (i.e. little more than three times longer than setae f on tergite EF), separated by distance of 29 (34 ?). All idiosomal tergites weakly, sparsely granulated; posterior margins of tergites striated.

Ventral side (Fig. 8): propodosomal plate 41 long, 80 wide, concave anteriorly between anterial ends of apodemes I, with slightly, convexly curved posterior edge. The ridge between anterolateral ends of apodemes I and II weakly defined, only slightly bend. Apodemes I strong and thick, its anterolateral ends 18 (18) apart. Apodemes II moderately thick, not fused with anteromedian apodeme; its anteromedial ends 45 (36 ?) apart, posteromedial ends with small nodules. Anteromedian apodeme fused with apodemes I, with distinct nodule and weakening between apodemes I and II. Segment between apodemes II and transverse apodeme formed as the solide, distinct anchor-like thickening, followed posteriad by less sclerotized diffused area of the breast platelet, broadly fused with medium of transverse apodeme. Transverse apodeme broad, thick with series of nodules along its length. Coxal setae 1a located on the middle of posterior edges of apodemes I, 4 long and 5 apart. Coxal setae 2a 9 long, located in the same relation to apodemes II as 1a to apodemes I, 58 apart. The surface of propodosomal plate finely, indistinctively granulated on coxal plates I (area between ap I and ap II); ornamented with delicate waves or folds on coxal plates II; ventral ornamentation of propodosomal plate geting more distinct medially and weak lateraly. Apodemes III thick but not strong, slightly extend lateraly beyond anterial extremities of trochanters III. not connected with posteromedial apodeme.

Apodemes IV and posteromedial apodeme not strongly defined, connected together by diffused area into one, untypical for tarsonemids complex (similar structure previously reported for *T. indoapis* by LINDQUIST 1968, and *T. elbrusi* by KALISZEWSKI & SELL 1985). Both apodemes IV and posteromedial apodeme don't reach the level of anterior extremities of trochanters IV, however posteromedial apodeme slightly longer posteriorly. Coxal setae 3a 5 (4) long, located little anteromediad of apodemes III; coxal setae 3b 5 (5) long, located on the posterial ends of apodemes IV. Apodemes IV expanded and diffused anteriorly but not connecting clearly with apodemes III. Anterial bifurcation of posteromedial

apodeme broad, diffused, connected neither with apodemes III nor with IV.

Posterior edge of metapodosomal plate double concave on each side, characteristically for species in point where legs III and IV with its trochanters joined. Trochanters IV divided by distance of 2.4 of their width; tegula about 1.6 as wide [9 (5 ?)] as long [14 (8 ?)]. Lateral genital plates close each other, medial genital plate covers most of "bursa copulatrix" complex. Segment PS visible, setae ps 7 (7) long, located 13 apart. All ventral setae smooth, short, pointed. Ventral metapodosomal plate covered by weak fine granulation increasing toward middle of ventrum.

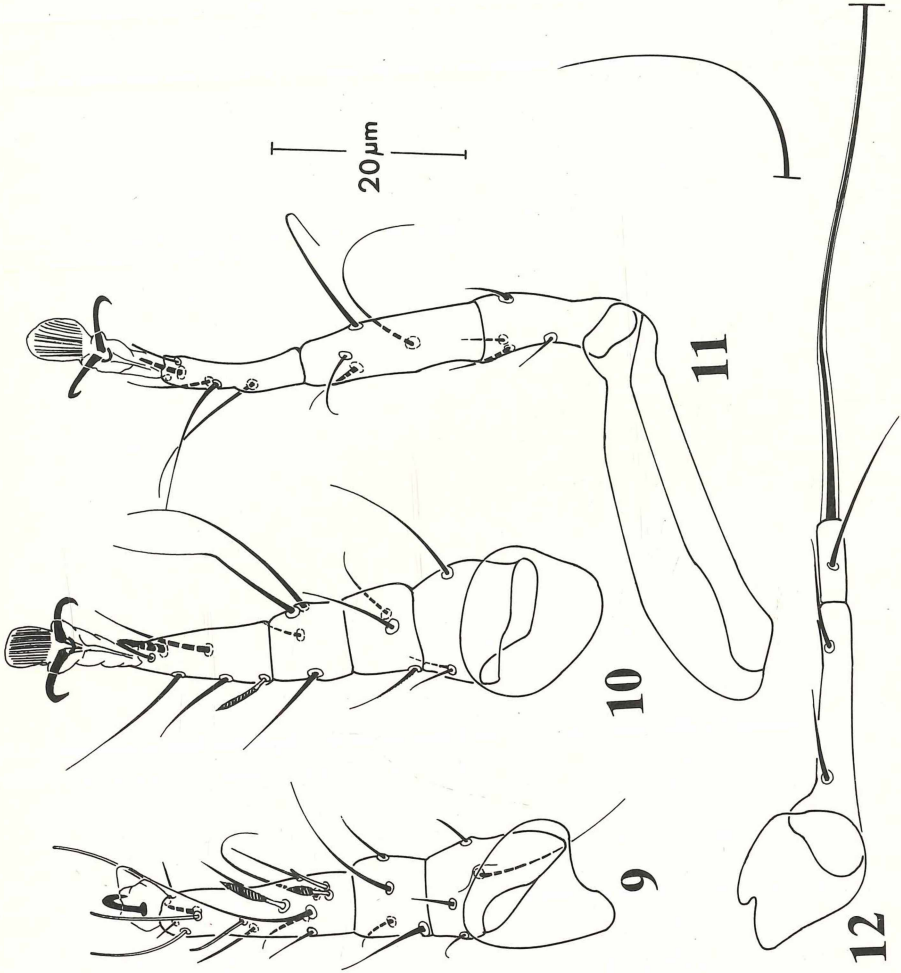
Legs (Figs. 9-12): longitudinal relations of legs: 1 : 1.15 : 1.3 : 0.75 (measured from the apex of empodium II, III or claw I or last segment of leg IV to the proximal end of femur I, II or femurogenu III and IV).

Leg I chaetotaxy: 4-4-6 ($1\phi_1$)+7(1ω). Pretarsus I approximately as long as wide; the claw, relatively stout, strongly hooklike, flanked by two minute thin setae u' and u''. Three eupathids inserted in distal one-fifth on tibiotarsus I (tc'', p', p'') and one (tc') inserted slightly distad of transverse midline of segment. Subunguinal setae s of all legs spinelike, unguinal setae u' and u'' delicate, poorly visible, adhesed to pretarsus. Tarsal solenidion ω 7 (6) long, with spindle shaped head, slightly longer than its stalk, obliquely striated. Tibial solenidion ϕ_1 5 long, with spindle-like head, obliquely striated as well, eupathid k subequal in length to ϕ_1 (6 long), rodlike. Of four genual setae two are longer and two shorter (seta GeI l'' stiffer). Of four femoral setae two (l' and l'') are short, slender one (v'') tapered, longer than femur but shorter than tibiotarsus (without pretarsus), and one (d) short, spiculate, stouter.

Leg II chaetotaxy: 3-3-4-4 (1ω). Pretarsus II with large, striated empodium (adhesing type) and a pair of relatively strong, well developed hooklike claws (untypically for *Tarsonemus* as well). Pretarsus II only little shorter than tarsus II. One unguinal seta is visible (u''). Tarsal II solenidion 5 long, elongated, spiculate, obliquely striated. Tarsal spine pl'' absent. Of four tibial setae two (d, v') slender, whip-like, little shorter than whole tarsus (with pretarsus); one 1.5 time longer than tibia II, stiffer, and one, short, weak. Genual seta l' slightly longer than genu, sparsely barbed. Femoral seta v as long as combined length of tibia and genu II, smooth, tapered.

Leg III chaetotaxy: 1+3-4-4. Pretarsus III with large striated empodium and a pair of strong, hooklike claws. Unguinal seta u' present. Pretarsus III subequal to pretarsus II. Of four tibial setae two longer and two shorter. Femurogenual setae subequaly short, only one seta l slightly longer.

Leg IV: 38 long (without trochanter) with femurogenu about 3 times longer (27 long) than tibiotarsus (9 long). Of femurogenual setae proximal v'F shorter (9) than distal v'G (10),



Figs. 9–12: *Tarsonemus platynopodae* sp. n., female. – 9: leg I; 10: leg II; 11: leg III; 12: leg IV.

both slender, tapered. Tibiotarsal subapical seta tc'' untypically slender, thinner than normally in tarsonemid females, 18 long. Apical seta ap v'Ti extremely long and thick in relation to tc'', 99 long i.e. about a half of length of a whole body, and 2.6 times longer than leg IV (without trochanter).

Male (paratype): body length 131 (measured from the apex of gnathosoma to the posterior extremity of genital capsule).

Gnathosoma (Figs. 13 and 14): similarly shaped to that of a female though smaller in sizes: 23 long, 18 wide, with pharynx 9 long and 4 wide; cheliceral levers small, about 2 long, oriented obliquely. Chelicerae minute, hardly distinguishable; palpi little smaller (in relation to whole gnathosoma) than those of a female. The rest of characters formed as in female.

Idiosoma: of elongated bitrapezoidal shape, 117 long. Dorsal side (Fig. 13) with distinct pointed granulation. Prodorsal shield trapezoidal, subcircularly truncate anteriorly. Vertical setae v_1 23 long, 13 apart, v_2 14 long, 20 apart. Scapular setae sc_2 45 long, 22 apart, sc_1 25 long, 32 apart. Prodorsomedial apodeme formed as a weakly defined short line. Tergites CD formed as subquadrangular shield; setae c_2 23 long and 58 apart, setae c_1 29 long, 45 apart, setae d 18 long and 36 apart; distance between setae c_2 and c_1 32 long on each side. Setae f on tergite EF 27 long, 18 apart.

Genital capsule 27 long, 18 wide, with hyaline rim dorsally, and two minute setae h 2 long each, located 7 apart. Three-armed accesory organ present. All setae on dorsal side tapered, slender, delicately barbed.

Ventral side (Fig. 14): anteromedian apodeme connecting anteriorly with apodemes I, interrupted slightly anteriad of posteromedial ends of apodemes II and not uniting with transverse apodeme. Anterolateral ends of apodemes I 13 apart, while the same of apodemes II 29 apart. Apodemes II slightly curved medially, not connected with anteromedian apodeme. Transverse apodeme continuous, thick though diffuse. Anterial border delineating coxal fields IV, III, and lateral fields of metapodosomal plate formed as thick, diffuse apodeme-like structure, with stronger ridges anteriad of coxal fields IV and III (probably coalescent anterial ends of apodemes III and IV). Posteromedial apodeme uniting with that structure, continuous, with three armed nodule located in one-sixth anteriorly of their length, and threefold branched posteriorly. Apodemes III and IV straight, anteriorly uniting with apodeme-like structure, posteriorly reaching the edge of metapodosomal plate.

Coxal setae 1a 4 long, located 9 apart, 2a 9 long, 18 apart, 3a 9 long, 34 apart and 3b 8 long, 40 apart. All ventral setae smooth, slender, pointed. Propodosomal plate granulated conspicuously but sparsely in area of coxal fields II; metapodosomal plate with pointed granulation on lateral

and coxal III fields, while coxal fields IV with thicker, dimpled ornament. Metapodosomal ornamentation weaker medially and posteriorly.

Legs (Figs. 15-18): longitudinal relations of legs respectively: 1 : 0.9 : 1.05 : 1.5. (measured from apex of claw (leg I and IV) or epodium (legs II and III) to the proximal ends of femora I-IV).

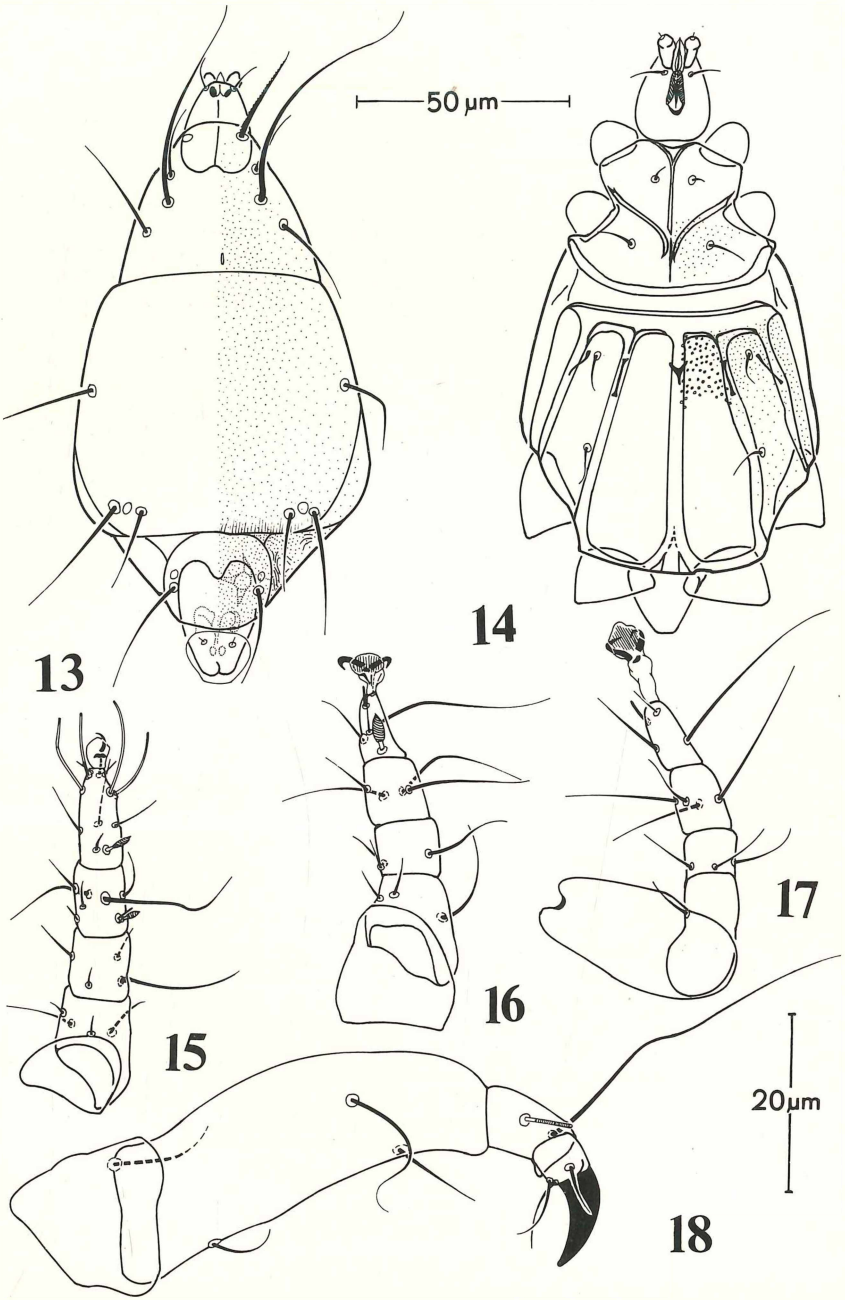
Leg I chaetotaxy: 4-4-6($1\phi_1$)-9(1ω). Pretarsus I little longer than wide, claw curved, sickle shaped, not strong. Tarsus I subequal in length with tibia, femur subequal to combined length of genu and tibia I. Unguinal setae u' and u'' visible, subunguinal seta s not apparently spine- but rather rod-like, weaker than that of a female. One eupathid (p') inserted apically at pretarsus, three (p'', tc', tc'') inserted in one-fourth distally of tarsus length. Solenidion ωI 3 long, inserted in one-fifth proximal on segment, with spindle-shaped obliquely striated, longer than its pedicel head. Tarsal seta ft' lacking. Tibial solednidion ϕ_1 2 long, with spindle-like obliquely striated head as well; eupathid k 3 long, rodlike, minute. Of four genual setae one is 2.5 times longer than intermediate second, and two are apparently shorter. Of four femoral setae two are longer and two are shorter.

Leg II chaetotaxy: 3-3-4-4(1ω). Pretarsus II with apparent broad, striated empodium and a pair of curved, hooklike claws. Tarsus II about 1.5 time as long as pretarsus, bears three setiform setae, one subunguinal seta s, one unguinal seta u' and one spindle-headed solenidion 5 long. Tarsal spine pl'' absent. Among four tibial setae three slender, whiplike and one shorter, stiffer. On genu and femur II one seta longer, slender, and two shorter (each segment).

Leg III chaetotaxy: 1-3-4-3. Pretarsus III with striated empodium and a pair of strongly curved claws; slightly longer than tarsus III. Rodlike seta s and unguinal seta u' inserted slightly proximad of pretarsus. Of two setiform setae on tarsus III, one 2.5 times longer than another. Tibia III bears three longer and one shorter setae. Setae on genu setiform, equal in size; femoral seta little shorter than genual ones (approximately as long as genu III). Femur III about as long as combined length of tibia and tarsus III (without pretarsus) and three times longer than genu.

Leg IV chaetotaxy: 1-1+2-2-3. Leg IV strong, solid, 54 long i.e. 1.5 time longer than leg I, II and III and about 0.4 as long as the entire length of the body. Terminal claw 5.5 wide at its base and 11 long (straight segment from apex to the middle of the base) i.e. as long as tibia IV. Tarsus free, with three setiform setae equal in length; tibia IV with long whiplike seta and 7 long solenidion, about 1.5 longer than wide. Femurogenu IV three times longer than wide basally, slightly arched, with l'' G seta the longest, v'G

Figs. 13-18: *Tarsonemus platynopodae* sp. n., male. - 13: dorsal side; 14: ventral side; 15: leg I; 16: leg II; 17: leg III; 18: leg IV.



midlength and v'F the shortest. Trochanter IV about 1.2 long laterally as wide basally, bears one seta approximately as long as v'G one.

Type material and habitat

Female holotype, female paratype and male paratype of *Tarsonemus platynopodae* sp. n. were collected by F.S. LUKOSCHUS 09.05.1979 in Kuala Pilah (Malaysia), from *Xylocopa (Platynopoda) latipes* nest located in an undurable wood rafter of house abandoned since 1962, already fallen together. At present all types of this species (holotype slide No. A 53/86, female paratype slide No. A 54/86 and male paratype slide No. A 55/86 are deposited in the Zoological Museum at Hamburg University, Hamburg (Federal Republic of Germany).

Female holotype and 31 female paratypes of *Tarsonemus xylocopae* sp. n. were collected by V. HERRERA, 23. 08. 1982 in Aquacate, Capira (Panama) from a *Xylocopa frontalis* nest located in a dead branch of tree *Luehea seemani*. Holotype slide No. A 56/86, and 15 paratypes slides No. A 57/86 to A 71/86 are deposited in the collection of the Zoological Museum of Hamburg University; 10 paratypes are deposited in Department of Animal Morphology of A. Mickiewicz University in Poznań (Poland); two paratypes also are located in Canadian National Collection in Ottawa (Canada).

Due to the fact that the main subject of sampling were the investigation on *Sennertia* spp. and some other species, further specimens of both newly described *Tarsonemus* species are supposed to be included in microslides with larger mites as impurities; the largest part of sampled material (about 300 slides) is deposited in Antwerpen/Belgium (*Sennertia* spp.) and Ann Arbor, Michigan/U.S.A. (*Chaetodactylus* spp.; F.S. LUKOSCHUS, personal communication).

Discussion

I. Remarks on morphology

In order to make the description more precise I considered apropirate to mention the existence of two apodematal structures symmetrically arranged near the posterolateral "corners" of prodorsal shield, as distinct of the apodeme occuring in posteromedial part of prodorsal shield [to date known as prodorsal apodeme (LINDQUIST 1978, KALISZEWSKI & MAGOWSKI 1985) or dorsal apodeme on the propodosomal shield (SUSKI 1967)]. In accordance to the arrangement on the prodorsal shield I propose to name the former apodemes as prodorsolateral apodemes and the latter as the prodorsomedial apodeme (Figs. 1 and 7). These details of morphological build-up (discussed partly by KALISZEWSKI & MAGOWSKI 1985) can be useful as an additional feature in systematic description of tarsonemids.

Seldom reported and found among *Tarsonemus*, the diffused form of an apodematal metapodosomal complex in the case of *T. platynopodae* female holotype draws ones attention. Such form of considered feature is very poorly visible in one known female paratype (here rather similar to that

of *T. xylocopae*) due to its distortion caused by death long before mounting. For this reason it seems to be impossible to consider this feature condition characteristic for species at present although LINDQUIST (1968) regarded that as characteristic for *T. indoapis* LINDQUIST, 1968. The occurence of this feature in its most popular state in the case of closely related *T. xylocopae* gives evidence of the lack of connections with their biology. On the other hand, extensive form of the apodematal complex of the metapodosoma in the species for which close connections with insects were not reported so far, can be viewed (e.g. *T. elbrusi* KALISZEWSKI & SELL, 1985).

During examinations I stated that the females of both *T. platynopodae* and *T. xylocopae* have an apical seta of leg IV with a visible, clearly marked dark medial zone along its length. Careful observation suggests a core character of this structure, any certain interpretation, however, is not possible at the moment.

II. Notes on the biology

The only data on biology of considered species result directly from the site where they were found: namely from nests of *Xylocopa latipes* (made in old rafter in Malaysia) and *X. frontalis* (made in a dead tree branch in Panama).

Taking into account the very fact of considerable resemblance and conspicuous affinity of both newly described species on the one hand, and their geographic distribution on the other, some conclusions on their tight relationships with hosts can be drawn. Their occurence together does not seem accidental, so it is highly probable that they are even commensals of nests with some tendention to phoresy. In spite of the lack of informations on tarsonemid phoresy on *Xylocopa* spp., the following features suggest this phenomenon (at least for *T. xylocopae*):

- consistent habit of body,
- relatively short legs (both for *T. xylocopae*),
- strong, hooklike claws,
- striated empodia (for both species).

An additional support for this view is the existance of another tarsonemid (unrelated to the former) *T. indoapis,* described and reported from another apoid, *Apis indica,* as an epizoic commensal by LINDQUIST (1968).

III. Systematics remarks

Under consideration both species are to some extent similar to *Tarsonemus apis* RENNIE, 1918 by sharing the following features (HIRST, 1922, LINDQUIST 1968):

- shape and internal structure of the gnathosoma,
- lack of tarsal II spine pl'',
- shape of propodosomal apodemes,
- similar dorsal chaetotaxy (especially prodorsal shield and C tergite.

Differences between the new group of species and *T. apis* are listed later and are enclosed in the group diagnosis.

LINDQUISTs remarks that "*T. apis* is an extremely common and apparently cosmopolitan associate of honey bees and other social apoids", for the teritory of Poland is not convinced so far due to the record of BANASZAK (1980) and CHMIELEWSKI (1971) who stated only the occurence of *T. fusarii* COOREMAN, 1941 in *Apis melifera* hives and *Bombus spp.* nests. The presence

of *T. rakoviensis* KROPCZYNSKA, 1965 (= *T. granarius* LINDQUIST, 1972), at least theoretically can be also expected.

The other species comparable to *T. xylocopae* group are:
- *T. rakowiensis* KROPCZYNSKA (= *T. granarius* LINDQUIST) - similar build of gnathosoma,
- *T. willmanni* SCHAARSCHMIDT, 1959 - some dorsal side and legs setation features,
- *T. lobosus* SUSKI, 1965 - leg chaetotaxy.

Features characteristic for *Tarsonemus xylocopae* group are (females):
1. Relatively longer than usually, approximate palps, located on the apex of gnathosomal capsule,
2. Gnathosoma oval, finally (anteriorly) elongated into the short snout,
3. Lack of postpalpal pair of setae,
4. On leg I- lack of ϕ_2 tibial solenidion, lack of tarsal seta ps",
5. On leg II- lack of tarsal spine pl", three normal setae present,
6. On leg III- three normal setae on tarsus present,
7. On leg IV- very weak subapical seta tc" (subequal to v'F and v'G),
8. Moderately strong, hooklike claws of legs I, II, III (4-4.5 : 1, length: width),
9. Apparently striated empodia of legs II and III,
10. Spindle headed solenidia,
11. Consequent arrangement of dorsal opisthosomal setae: d, e, f short, stouter, h 2-3 time longer than former.

Male:
female features 1, 2, 3, 4, 5, 8, 10, and moreover
12. On leg III two normal setae on tarsus,
13. Leg IV 1.5 time as large as leg III,
14. Dorsal opisthosomal setae f 1.33 as long as d and slightly shorter than c_1,
15. Copulatory complex under well developed tergite EF, 1.25 as long as gnathosoma, 1.5 longer than wide.

Features (character states) posessing atributes of synapomorphis shared by the members of new group are 4 (lack of ϕ_2), 7, 8, 9, 10 (apparent modification occuring independently in some tarsonemid forms associated with insects), and 13.

Both members of the new group differ by features listed below:

T. xylocopae sp. n.	*T. platynopodae* sp. n.
1. Setae v_1 more or less as long as distance between their bases	Setae v_1 conspicuously longer than distance between their bases
2. Scapular setae sc_2 shorter than distance between their bases	Setae sc_2 longer than distance between their bases
3. Setae c_2 conspicuously longer than c_1	Setae c_2 little longer than c_1
4. Setae h two times longer than d, e, f	Setae h three times longer than d, e, f
5. Setae 3a about 0.5 of distance between their bases	Setae 3a about 0.2 of distance between their bases

	T. xylocopae sp. n.	*T. platynopodae* sp. n.
6.	Setae 3b about 0.4 of distance between their bases	Setae 3b about 0.18 of distance between their bases
7.	Tibiotarsus I little longer than its two basal widths	Tibiotarsus I as long as its three basal widths
8.	Combined length of Fe, Ge, Ti II approximately as long as tarsus with pretarsus II	Combined length of Fe, Ge, Ti II markedly longer than tarsus with pretarsus II
9.	Two last segments of leg IV (Fege, Tbt) always shorter than Fege and Tb of leg III	Two last segments of leg IV apparently longer than Fege and Tb of leg III
10.	Seta tc" of leg IV less than 1.5 time longer than Tbt IV, and subequal to v'G	Seta tc" two times longer than Tbt IV, and 0.33 of its length longer than v'G

Because of conspicuous habitat separateness (carpenter bees nest association) and discernible derived features shared only by members of this group, it seems reasonable to constitute for *T. xylocopae* and *T. platynopodae* a special group of species to distinguish them from other species of the genus *Tarsonemus* CANESTRINI & FANZAGO, 1876. Subgenus or even genus status cannot be established due to the lack of other material (both species and specimens) which does not allow to examine variation, habits and biology, or dimension of an evolutionary gap between *T. xylocopae* group and other members of *Tarsonemus*.

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