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# A new species in the genus *Phyllocoptes* Nalepa (Eriophyidae) from greenhouse roses in Poland

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ABSTRACT — A new eriophyid mite species in the Phyllocoptinae, namely *Phyllocoptes resovius* **n. sp.**, is described from *Rosa hybrida* 'Whisky Mac' (Rosaceae) from Poland. This vagrant species was collected in a greenhouse rose production system and causes malformation and stunted plant growth. It is the fifth species in the *Phyllocoptes* genus reported from roses. Symptoms caused by *P. resovius* are compared with those caused by the other species.

KEYWORDS — Eriophyoidea; Phyllocoptinae; *Rosa*; Europe; taxonomy; mite pest

## INTRODUCTION

The genus *Rosa* (Rosaceae) comprises around 100 wild species distributed mainly throughout the Northern Hemisphere and several thousand cultivars worldwide (Gu and Robertson 2003). The modern cultivars of *Rosa hybrida* L. result from a long history of interspecific hybridizations, specially between European tetraploids and Asian diploid species, having as ancestor *Rosa gallica* L. (El Mokadem *et al.* 2000, Crespel and Gudin 2003). Hybrid roses are recognized highly valuable for economical benefits, being the best source of raw material to be used in agro-based industry, especially in the cosmetics and perfumery (Butt 2005). Today roses are among the most important ornamental plants worldwide. Internationally, the cut flower industry, of which rose accounts for two thirds, exceeds US$ 40 billion per year (Hoy 2013).

Up to date, 19 eriophyoid species belonging to ten different genera have been found on roses worldwide (E. de Lillo and J.W.Jr. Amrine, unpubl. databases, Druciarek and Lewandowski 2016, Ji-Wei *et al.* 2015, Kamali *et al.* 2015). The genus *Phyllocoptes* Nalepa on roses is represented by four species and two among them are considered economically important pests. In the USA, serious damages are caused by *Phyllocoptes fructiphilus* Keifer, 1940, which is responsible for rose rosette virus (RRV) transmission on roses growing in natural environments as well as in parks and gardens. RRV is the causal agent of rose rosette disease (RRD), the most damaging rose disease in North America, that poses a major threat to the rose industry and home-growers alike (Laney *et al.* 2011, Amrine 2014, Di Bello *et al.* 2015). The second species, *Phyllocoptes adalius* Keifer, 1939, causes serious injuries on plants cultivated in greenhouses in Europe, where mites can rapidly establish populations and stunting their growth, causing leaf drop and malforma-

tion of flowers (Druciarek *et al.* 2014). Roses being cultivated for millennia, are nowadays the top popular flowering plants in the world and therefore finding a new rose pest in greenhouse production in Europe is an important fact for growers.

The aim of this paper is to describe a new *Phyllocoptes* species, namely *Phyllocoptes resovius* **n. sp.**, found in a greenhouse rose production system in Poland. Here we present morphometric data, drawings and scanning electron microscopy (SEM) images of this new vagrant eriophyid mite. In addition symptoms caused by the new species are compared with those caused by *P. adalius.*

## MATERIALS AND METHODS

Rose samples (leaves and shoots) were collected from greenhouse rose (*Rosa hybrida* L. 'Whisky Mac' Rosen Tantau, Germany) production systems in south-eastern Poland (near the city Rzeszów) in December 2014, and March and May 2015. More than 1200 specimens of the new species from these samples were collected through direct examination under a stereomicroscope Olympus SZX7, and mounted on slides in a modified Berlese medium (Amrine and Manson 1996). Specimens were studied using a phase-contrast microscope Olympus BX41 associated with digital camera (ColorView IIIu and Cell D Soft Imaging System) connected to a computer. The morphological terminology, systematic classification and abbreviation used in figures follows Lindquist (1996) and Amrine *et al.* (2003). All measurements are in micrometres and unless specified otherwise, are lengths. Measurements of mites were made according to Amrine and Manson (1996) and de Lillo *et al.* (2010). Drawings were made according to de Lillo *et al.* (2010), using a drawing tube attached to a microscope. Initial drafts of drawings were digitalised with computer scanner. Final plates were produced using the Adobe Photoshop Elements 8 and Adobe Illustrator CS6 software. Length of legs was measured from the posterior margin of trochanter to the tip of the tarsus. Positions of leg setae were measured from the proximal margin of the seta-bearing segment. Positions of ventral setae *c2*, *d*, *e* and *f* on ventral annuli were counted from the first entire ventral annulus after posterior margin of coxae II. The holotype female measurement precedes the corresponding range for paratypes (given in parentheses). For males and immature stages, only the ranges are given. SEM photographs were taken using desktop scanning electron microscope Phenom Pro (Phenom-World BV, The Netherlands), without earlier preparation of studied specimens. Type specimens on microscope slides are stored in two collections: Department of Applied Entomology, Warsaw University of Life Sciences – SGGW and Museum and Institute of Zoology, Polish Academy of Sciences, Warsaw, Poland.

## RESULTS

**Family Eriophyidae Nalepa, 1898**
**Subfamily Phyllocoptinae Nalepa, 1891**
**Tribe Phyllocoptini Nalepa, 1892**
**Genus *Phyllocoptes* Nalepa, 1887**
***Phyllocoptes resovius* n. sp.**
**(Figures 1 – 4)**

Diagnosis — Prodorsal shield pattern composed of incomplete median line located on rear part of the shield and complete admedians and submedians lines. Lines, especially median and admedians, covered with waxy secretions. Opisthosoma evenly rounded dorsally, with 53 – 67 dorsal annuli and strong triangular microtubercles, usually covered with waxy secretions. Microtubercles forming four rows through entire opisthosoma; two inner rows composed of large and two outer of small microtubercles; other microtubercles placed irregularly. Genital coverflap with 5 – 9 longitudinal ridges. Empodium 6-rayed.

**Female** (Figures 1 and 2) holotype and 10 paratypes — Body fusiform, light amber in colour, 257 (165 – 277); width 67 (65 – 77).

Gnathosoma — 23 (23 – 26), curved downward, dorsal pedipalpal genual setae *d* 9 (8 – 10), setae *ep* 3 (3), pedipalp tarsal setae *v* 3 (2 – 3), cheliceral stylets 19 (17 – 22).

Prodorsal shield — 45 (42 – 48), 56 (53 – 60) wide, subtriangular with triangular frontal lobe, apically

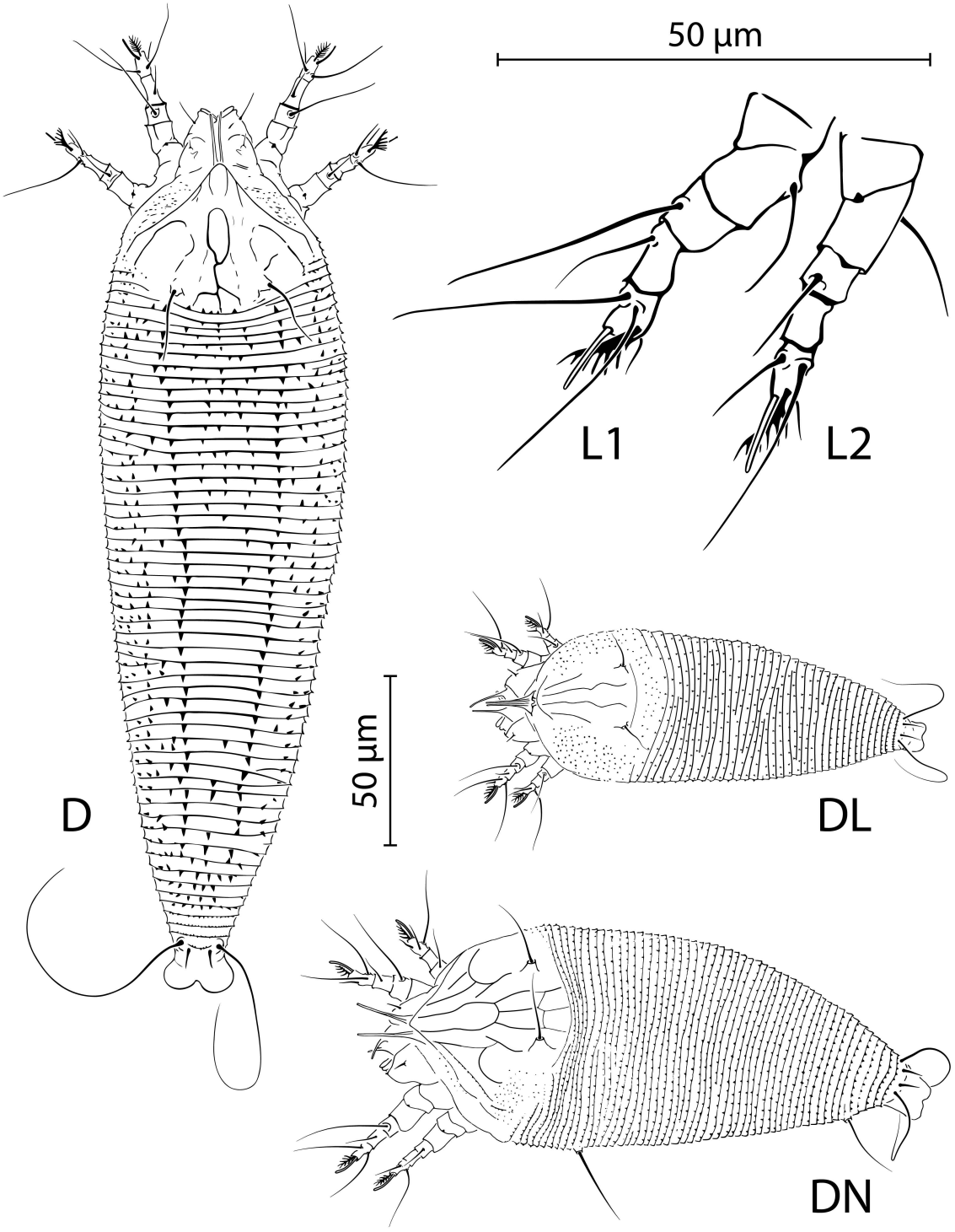


FIGURE 1: *Phyllocoptes resovius* **n. sp.** female: D – dorsal habitus; L1, L2 – legs; immature: DL – dorsal larva; DN – dorsal nymph..

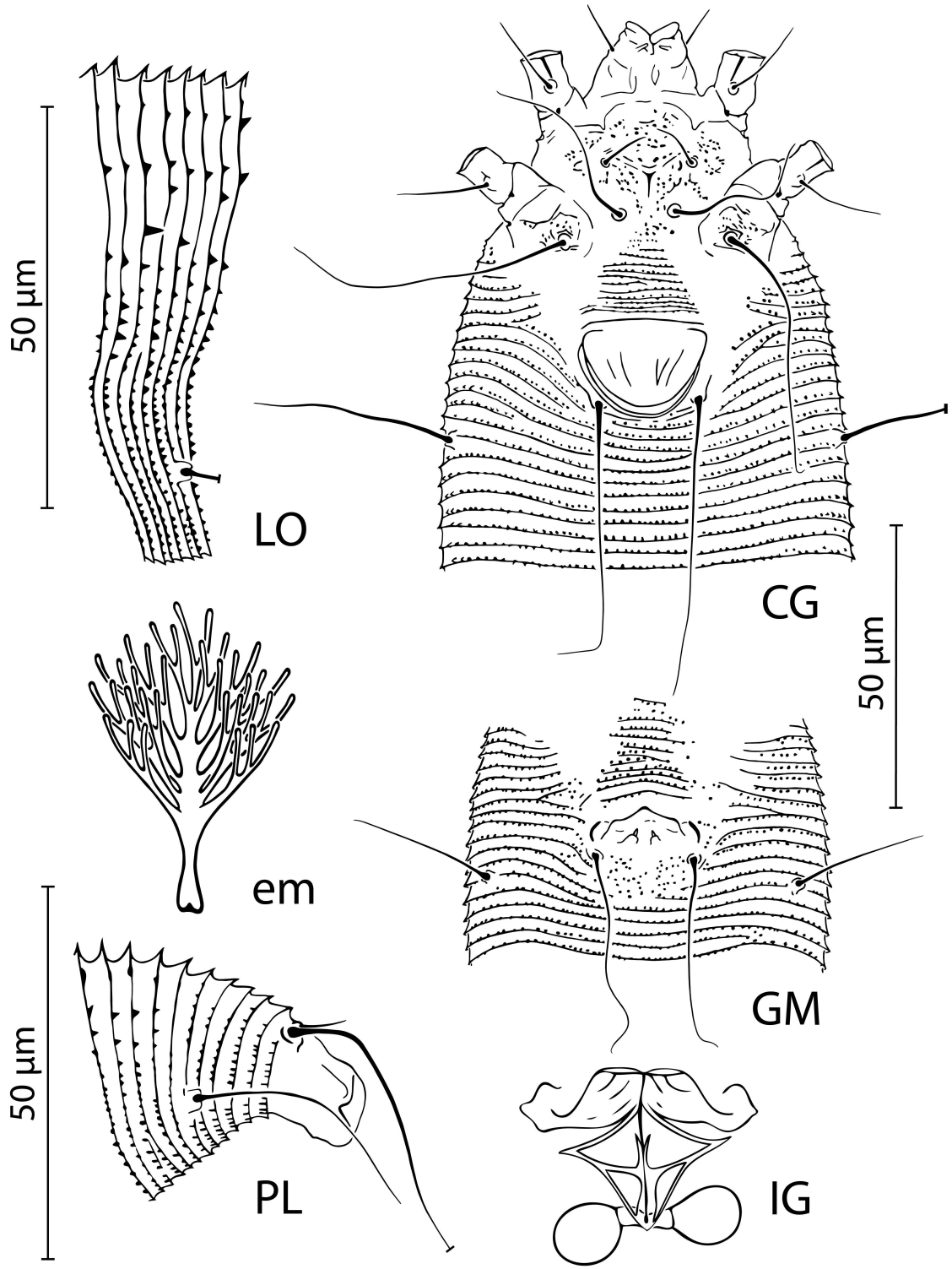


FIGURE 2: *Phyllocoptes resovius* **n. sp.** female: LO – lateral opisthosoma; CG – coxo-genital region; em – empodium (enlarged); PL – postero-lateral habitus; IG – internal genitalia (enlarged); male: GM – genital region.

rounded, 7 (5 – 8) over the gnathosomal base. Shield pattern: median line only on rear part of shield; at about 2/3 length of shield the line is bifurcated and joined with admedian lines, forming V-shaped mark; at about 2/3 its length there are lines perpendicular or running slightly to the rear and joining with admedian lines. Admedian lines very weak, well seen only in their middle part. The lines are parallel from anterior margin of the shield to about 1/3 of its length, where they are joined by transverse line; from that place admedian lines gradually diverging to rear margin and joined with median lines in 2/3 and at the end of shield length. Submedian lines I slightly sinuate and gradually divergent from anterior margin of the shield to its rear margin. Submedian lines II curved, joined with submedian lines I at their 1/3 length. Median line, middle part of admedian lines and lines joining median and admedian lines strongly covered with waxy secretions. Scapular setae *sc* tubercles 4 (3 – 4), in the inner sides longitudinal, related to body axis and in outer sides a little bit diagonal, located ahead of rear shield margin, 24 (23 – 28) apart; *sc* 21 (18 – 22) directed upwards.

Legs — with all usual segments and setae present. Leg I 33 (31 – 34); femur 10 (9 – 10), basiventral femoral seta (*bv*) 16 (14 – 16), position of *bv* 4 (4 – 5); genu 5 (5 – 6), antaxial genual seta (*l″*) 28 (24 – 29), position of *l″* 3 (3 – 4); tibia 9 (7 – 9), paraxial tibial seta (*l′*) 9 (9 – 11), position of *l′* 3 (3); tarsus 8 (7 – 8), antaxial fastigial tarsal seta (*ft″*) 26 (23 – 27), paraxial fastigial tarsal seta (*ft′*) 24 (21 – 26), paraxial unguinal tarsal seta (*u′*) 8 (7 – 8); tarsal solenidion ($\omega$) 9 (8 – 9); empodium simple 7 (6 – 7), bilaterally symmetrical, with 6 (6) paired rays. Leg II 30 (29 – 32); femur 10 (9 – 10), *bv* 16 (13 – 17), position of *bv* 5 (4 – 5); genu 4 (4 – 5), *l″* 11 (10 – 12), position of *l″* 3 (3 – 4); tibia 6 (5 – 6); tarsus 8 (7 – 8), *ft″* 26 (23 – 27), *ft′* 10 (7 – 10), *u′* 7 (6 – 8); solenidion $\omega$ 9 (9 – 10); empodium simple 7 (6 – 7), bilaterally symmetrical, with 6 (6) paired rays.

Coxisternal plates with short lines and granules — Anterolateral setae on coxisternum I (*1b*) 10 (8 – 12), 15 (12 – 16) apart; proximal setae on coxisternum I (*1a*) 30 (22 – 32), 9 (8 – 11) apart; proximal setae on coxisternum II (*2a*) 51 (45 – 53), 28 (24 – 30) apart; distance between setae *1b* and *1a* 9 (8 – 10), distance between setae *1a* and *2a* 11 (8 – 11). Prosternal apodeme 6 (6 – 7).

External genitalia — 12 (12 – 16), 22 (21 – 25) wide, genital coverflap with 7 (5 – 9) longitudinal ridges; proximal setae on coxisternum III (*3a*) 61 (54 – 69), 17 (15 – 18) apart.

Opisthosoma — with 57 (53 – 57) dorsal and 68 (61 – 71) ventral annuli, 13 (10 – 13) coxogenital annuli. Dorsal annuli with triangular microtubercles usually covered with waxy secretions, placed on rear annuli margin. Microtubercles forming four rows through entire opisthosoma; two inner rows composed of large and two outer of small microtubercles; other microtubercles placed irregularly. Ventral annuli with microtubercles rounded and pointed, on posterior annuli microtubercles elongated, placed near rear annular margin. Setae: *c2* 32 (28 – 35), 63 (55 – 72) apart, on 10th (10 – 12) ventral annulus; *d* 64 (60 – 69), 35 (31 – 45) apart, on 22nd (21 – 25) ventral annulus; *e* 54 (53 – 61), 18 (16 – 22) apart, on 41st (37 – 42) ventral annulus; *f* 30 (27 – 32), 24 (23 – 26) apart, on 63rd (57 – 66) ventral annulus, 6th (5 – 6) annulus from rear. Setae *h1* 6 (5 – 6), 5 (5 – 6) apart; setae *h2* 75 (69 – 77), 9 (9 – 11) apart; distance between *h1* and *h2* 3 (3).

**Male** (Figure 2) (range of 7 specimens) — Body fusiform, 165 – 218; width 52 – 70.

Gnathosoma — 21 – 25, curved downward, setae *d* 7 – 9, setae *ep* 2 – 3, setae *v* 2, cheliceral stylets 16 – 17.

Prodorsal shield — subtriangular, 41 – 44, 46 – 56 wide, with frontal lobe 4 – 7 over the gnathosomal base and pattern similar to that of female, also covered with waxy secretions. Tubercles *sc* 3 – 4, located ahead of rear shield margin, similar to that of female, 21 – 26 apart; setae *sc* 14 – 19.

Legs — with all usual segments and setae present. Leg I 28 – 32; femur 9 – 10, seta *bv* 13 – 17, position of *bv* 4; genu 5 – 6, seta *l″* 21 – 27, position of *l″* 2 – 3; tibia 7 – 8, seta *l′* 7 – 9, position of *l′* 3; tarsus 6 – 7, setae: *ft″* 22 – 24, *ft′* 21 – 24, *u′* 6 – 7; solenidion $\omega$ 8 – 9; empodium simple 5 – 7, bilaterally symmetrical, with 5 paired rays. Leg II 26 – 30; femur 9 – 10, seta *bv* 13 – 15, position of *bv* 4

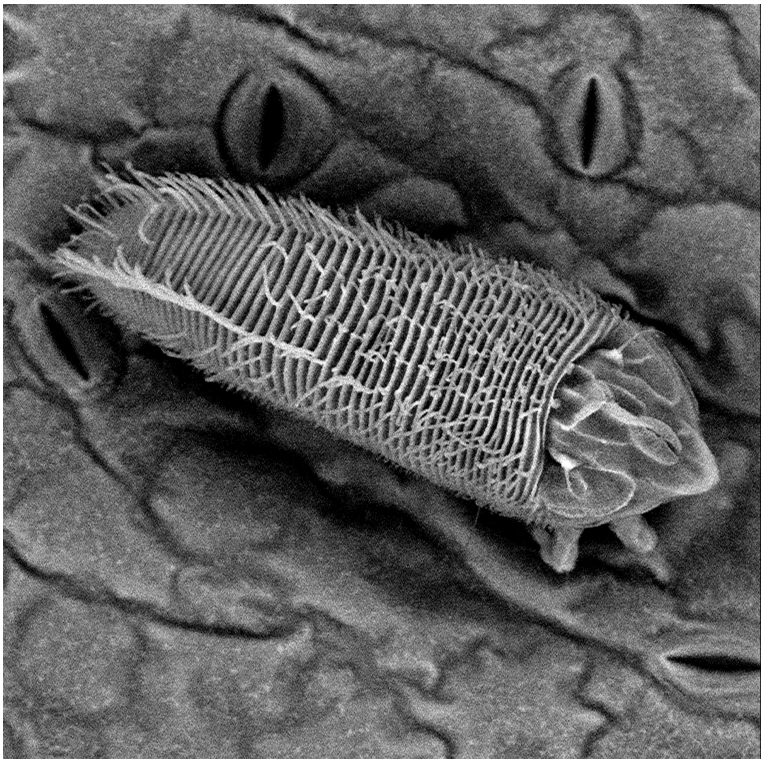

FIGURE 3: SEM photograph of *Phyllocoptes resovius* **n. sp.** – dorsal view.

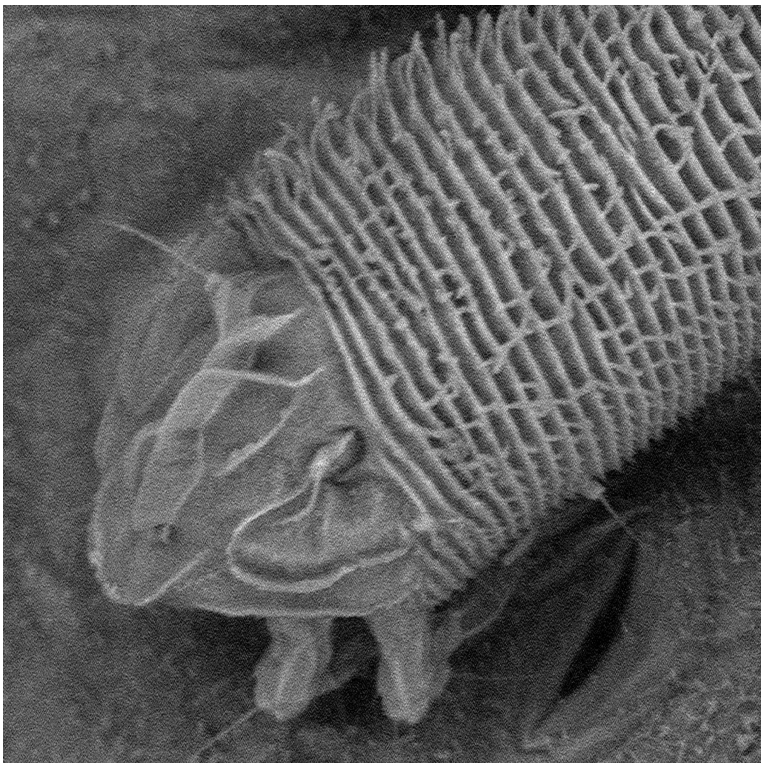

FIGURE 4: SEM photograph of *Phyllocoptes resovius* **n. sp.** – prodorsal shield and anterior opisthosoma.

– 5; genu 4, seta *l″* 9 – 12, position of *l″* 2 – 3; tibia 5 – 6; tarsus 7 – 8, setae: *ft″* 20 – 26, *ft′* 7 – 9, *u′* 6 – 7; solenidion *ω* 8 – 10; empodium simple 5 – 7, bilaterally symmetrical, with 5 paired rays.

Coxisternal plates with short lines and granules — Setae *1b* 8 – 9, 12 – 14 apart; setae *1a* 24 – 30, 8 – 10 apart; setae *2a* 40 – 44, 22 – 27 apart; distance between setae *1b* and *1a* 8 – 9, distance between setae *1a* and *2a* 8 – 10. Prosternal apodeme 5 – 6.

External genitalia — 14 – 16, 18 – 21 wide, surface below eugenital setae with granules; setae *3a* 50 – 56, 15 – 18 apart.

Opisthosoma — with 51 – 55 dorsal annuli, with shape and microtuberclation similar to that of female, also covered with waxy secretions; 56 – 67 ventral annuli and 10 – 12 coxogenital annuli. Setae: *c2* 25 – 31, 48 – 61 apart, on 8 – 12th ventral annulus; *d* 54 – 67, 31 – 37 apart, on 18 – 24th ventral annulus; *e* 49 – 55, 17 – 19 apart, on 32 – 39th ventral annulus; *f* 26 – 30, 21 – 24 apart, on 52 – 62nd ventral annulus, 5 – 6th annulus from rear. Setae *h1* 4 – 5, 4 – 5 apart; setae *h2* 54 – 71, 8 – 10 apart; distance between *h1* and *h2* 2 – 3.

**Nymph** (range of 5 specimens) — Body fusiform without waxy secretions, 141 – 191; width 45 – 56.

Gnathosoma — 21 – 23, curved downward, setae *d* 5 – 6, setae *ep* 2 – 3, setae *v* 1 – 2, cheliceral stylets 13 – 15.

Prodorsal shield — subtriangular, 32 – 41, 37 – 41 wide, frontal lobe 3 – 4 over the gnathosomal base with pattern similar to that of female. Tubercles *sc* 2 – 3, ahead of rear shield margin, 17 – 20 apart; setae *sc* 11 – 15.

Legs — with all usual segments and setae present. Leg I 19 – 24; femur 6 – 7, seta *bv* 8 – 10, position of *bv* 3 – 4; genu 4, seta *l″* 14 – 15, position of *l″* 2 – 3; tibia 4 – 5, seta *l′* 5 – 6, position of *l′* 2; tarsus 4 – 6, setae: *ft″* 14 – 17, *ft′* 10 – 12, *u′* 4 – 5; solenidion *ω* 6 – 7; empodium simple 3 – 4 with 4 – 5 paired rays. Leg II 17 – 22; femur 6 – 7, seta *bv* 7 – 11, position of *bv* 3; genu 3 – 4, seta *l″* 5 – 7, position of *l″* 2 – 3; tibia 3 – 4; tarsus 4 – 6, setae: *ft″* 14 – 17, *ft′* 5 – 6, *u′* 3 – 4; solenidion *ω* 6 – 7; empodium simple 3 – 4 with 4 paired rays.

Coxisternal plates with granules — Setae *1b* 5 – 6, 10 – 12 apart; setae *1a* 11 – 16, 7 – 10 apart; setae *2a* 28 – 34, 20 – 26 apart; distance between setae *1b* and *1a* 8 – 10, distance between setae *1a* and *2a* 7 – 9. Setae *3a* 29 – 37, 8 – 11 apart.

Opisthosoma — with 46 – 50 dorsal annuli with elongated microtubercles placed on rear margin of annuli and randomly distributed along annuli, 41 – 46 ventral annuli with rounded microtubercles, elongated on the posterior annuli, 4 – 7 coxogenital annuli. Setae: *c2* 17 – 21, 40 – 50 apart, on 7 – 8th ventral annulus; *d* 35 – 42, 22 – 31 apart, on 15 – 17th ventral annulus; *e* 35 – 38, 12 – 18 apart, on 24 – 27th ventral annulus; *f* 18 – 21, 17 – 21 apart, on 37 – 42nd ventral annulus, 5 – 6th annulus from rear. Setae *h1* 3 – 4, 4 apart; setae *h2* 44 – 47, 7 – 8 apart; distance between *h1* and *h2* 2 – 3.

**Larva** (range of 5 specimens) — Body fusiform without waxy secretions, 122 – 133; width 41 – 44.

Gnathosoma — 17 – 19, curved downward, setae *d* 4, setae *ep* 2, setae *v* 1 – 2, cheliceral stylets 12 – 13.

Prodorsal shield — subtriangular, 28 – 31, 29 – 33 wide, with frontal lobe 1 – 2 over the gnathosomal base. Shield pattern: median line absent; admedian lines entire, somewhat sinuate; submedian lines I on the anterior half of shield only; submedian lines II absent. Tubercles *sc* 1 – 2, ahead of rear shield margin, 14 – 18 apart; setae *sc* 10 – 11.

Legs — with all usual segments and setae present. Leg I 16 – 17; femur 5 – 6, seta *bv* 5 – 7, position of *bv* 3; genu 3, seta *l″* 11 – 13, position of *l″* 2; tibia 3 – 4, seta *l′* 4, position of *l′* 2; tarsus 3 – 4, setae: *ft″* 12 – 14, *ft′* 11 – 12, *u′* 3 – 4; solenidion *ω* 5 – 6; empodium simple 4 with 4 paired rays. Leg II 15 – 16; femur 5 – 6, seta *bv* 6 – 7, position of *bv* 3; genu 2 – 3, seta *l″* 5 – 6, position of *l″* 2; tibia 2 – 3; tarsus 4 – 5, setae: *ft″* 13 – 14, *ft′* 6, *u′* 3 – 4; solenidion *ω* 5 – 6; empodium simple 3 – 4 with 4 paired rays.

Coxisternal plates smooth — Setae *1b* 4 – 5, 9 apart; setae *1a* 10 – 13, 6 – 7 apart; setae *2a* 17 – 25, 19 – 21 apart; distance between setae *1b* and *1a* 7, distance between setae *1a* and *2a* 6 – 8. Setae *3a* 14 – 19, 7 – 8 apart.

TABLE 1: Comparison of morphological traits of *Phyllocoptes* species and *Callyntrotus schlechtendali* inhabiting rose plants.

| Characteristics | ***P. resovius* n. sp.** | ***P. adalius*** (Druciarek *et al.* 2016) | ***P. chorites*** (Keifer 1972) | ***P. fructiphilus*** (Keifer 1940) | ***P. linegranulatus*** (Styer 1974) | ***C. schlechtendali*** (Keifer 1939) |
|---|---|---|---|---|---|---|
| Length of body | 165–277 | 206–275 | 140–176 | 140–170 | 160 | 170–185 |
| Width of body | 57–77 | 65–77 | – | 43 | 62 | – |
| Length of gnathosoma | 23–26 | 22–25 | 27 | 32 | 21 | – |
| Length of prodorsal shield | 42–48 | 40–44 | 38 | 40 | 45 | 48 |
| Width of prodorsal shield | 53–60 | 48–56 | 44 | 40 | 50 | 45 |
| Length of setae *sc* | 18–22 | 17–21 | 13 | 20.5 | 14 | 14 |
| *Sc* setae tubercle apart | 23–28 | 21–27 | 20 | 16 | 22 | – |
| No. of dorsal annuli | 53–57 | 55–61 | 41 | 55 | – | 58–60 |
| No. of ventral annuli | 62–71 | 64–73 | 55 | 60 | – | 72–74 |
| Length of setae *c2* | 28–35 | 24–35 | 18–22 | 21 | 17 | 26 |
| Length of setae *d* | 60–69 | 47–65 | 48 | 46 | 16 | 42 |
| Length of setae *e* | 53–61 | 35–58 | 37 | 32 | 15 | 35 |
| Length of setae *f* | 27–32 | 25–35 | 21 | 25 | 28 | 25 |
| Length of genitalia | 12–16 | 11–14 | 14 | 14.5 | 14 | 17–20 |
| Width of genitalia | 21–25 | 21–25 | 21 | 23 | 22 | 22–25 |
| Length of setae *3a* | 54–69 | 41–58 | 20–25 | 32 | 14 | 16 |
| Ridges on genital coverflap | 5–9 | 9–11 | 8–10 | 6–7 | 10 | 8 |
| Length of leg I | 31–34 | 31–35 | 31 | 33 | 30 | 33 |
| Length of tibia I | 7–9 | 8–9 | 6.5 | 8 | 6 | 8.5 |
| Length of tarsus I | 7–8 | 6–7 | 7.5 | 8 | 7 | 7 |
| Rays in empodia I | 6 | 5–6 | 6 | 5 | 5 | 5 |
| Length of leg II | 29–32 | 30–33 | 28 | 29 | 26 | 31 |
| Length of tibia II | 5–6 | 5–7 | 4 | 5.5 | 4 | 7 |
| Length of tarsus II | 7–8 | 7–8 | 7 | 8 | 6 | 7 |

Opisthosoma — with 37 – 41 dorsal and 29 – 31 ventral annuli; microtubercles triangular placed near rear annular margin, elongated on the posterior annuli, 4 coxogenital annuli. Setae: *c2* 14 – 16, 36 – 40 apart, on 5 – 6th ventral annulus; *d* 30 – 34, 21 – 25 apart, on 11th ventral annulus; *e* 25 – 31, 12 – 14 apart, on 17th ventral annulus; *f* 15 – 19, 16 apart, on 26 – 28th ventral annulus, 4th annulus from rear. Setae *h1* 3, 3 – 4 apart; setae *h2* 26 – 38, 6 – 7 apart; distance between *h1* and *h2* 2.

Type material — Holotype female collected from *Rosa hybrida* L. 'Whisky Mac' (Rosen Tantau, Germany) in a greenhouse rose production near Rzeszów (49°59'N 21°57'E), Mazovian voivodeship, Poland, on 16 March 2015 by T. Druciarek. Paratypes: 10 females, 7 males, 5 nymphs, and 5 larvae with the same data as holotype.

Relation to the host plant — Vagrants, mainly on the lower leaf surfaces, as well as on stems and petals, causing malformation and stunted plant growth.

Etymology — The specific name is derived from the Latin name of city Rzeszów – *Resovia*, close to where the mites were found.

Remarks — *Phyllocoptes resovius* **n. sp.** is similar to other *Phyllocoptes* species (*P. adalius*, *P. chorites* Keifer, 1972, *P. fructiphilus*, *P. linegranulatus* (Styer, 1974)) inhabiting rose plants (Keifer 1939b, 1940, 1972, Styer 1974). However it can be easily distinguished from the other by composition of microtubercles located on dorsal opisthosoma and waxy secretions. In *P. resovius* **n. sp.** microtubercles form four rows through entire opisthosoma, two inner rows are composed of large and two outer of small microtubercles, other microtubercles are placed randomly. In other *Phyllocoptes* species from rose microtubercles are of small size only, placed randomly on entire opisthosoma and there are no rows or waxy secretions. The most important diagnostic characters of *Phyllocoptes* species from *Rosa* sp. are presented in Table 1.

*Phyllocoptes resovius* **n. sp.** is most similar (in ornamentation of prodorsal shield, numbers of ray on empodium, size and external genitalia and number of ridges on coverflap, shape of microtuber-

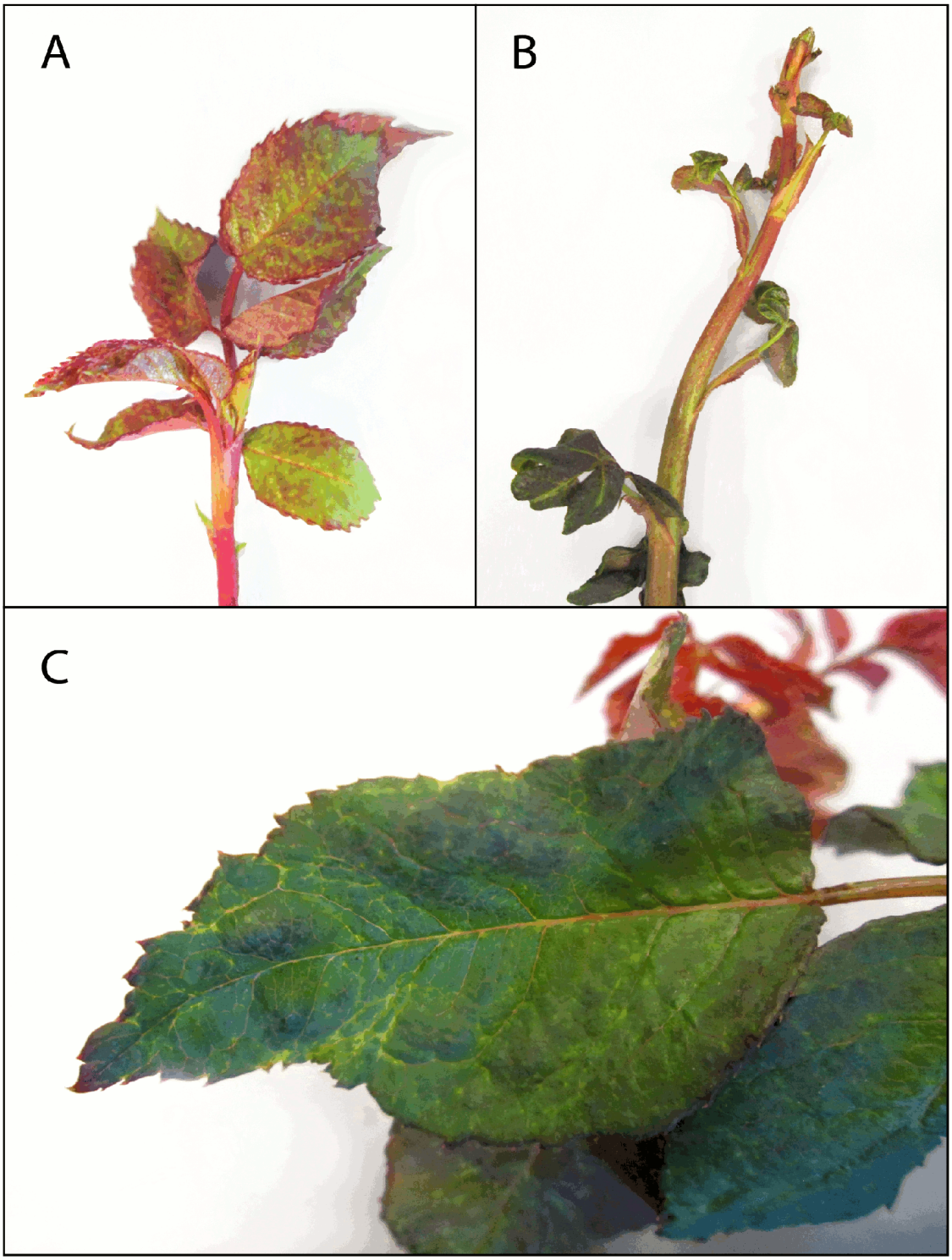


FIGURE 5: Symptoms caused by *Phyllocoptes resovius* **n. sp.**, on *Rosa hybrida* 'Whisky Mac' under greenhouse conditions: A – mosaic-red discolorations of young leaves; B – deformation and discoloration of newly developed shoot; C – deformation of fully developed leaf.

cles, as well as most of other diagnostic characters) to *P. adalius*, which is a common eriophyoid pest species in greenhouse rose production (Druciarek *et al.* 2014, Druciarek *et al.* 2016). However *P. resovius* **n. sp.**, aside from composition of microtubercles located on dorsal opisthosoma and waxy secretions covering microtubercles and prodorsal shield, can be distinguished from *P. adalius* by the length of setae *d* and *e*. Values of characters mentioned above are higher for *P. resovius* (Table 1). We have observed that both species cause similar injuries on infested rose plants under greenhouse conditions. Damages range from initial simple mosaic-red discoloration and deformation of leaves, to a severe delayed bud development and stunting of the whole plant. The initial symptoms of leaf discoloration and malformation are especially evident on newly developed leaves that may already harbor hundreds of mites (Figure 5).

*P. resovius* **n. sp.** is the second species with waxy secretions found on rose, after *Callyntrotus schlechtendali* (Nalepa, 1894), redescribed by Keifer (1939a). However, sculpture of prodorsal shield, shape of microtubercles, opisthosomal rows and waxy secretions, as well as plenty of other morphometric characters (see Table 1) clearly differentiate *C. schlechtendali* from the new species.

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## References

Amrine J.W. Jr. 2014 — What happens to *Phyllocoptes fructiphilus* in winter? — Amer. Rose, 42(12): 118.

Amrine J.W. Jr., Stasny T.A., Flechtmann C.H.W. 2003 — Revised keys to world genera of Eriophyoidea (Acari: Prostigmata) — Michigan: Indira Publishing House. pp. 244.

Amrine J.W. Jr., Manson D.C.M. 1996 — Preparation, mounting and descriptive study of eriophyoid mites — In: Lindquist E.E., Sabelis M.W., Bruin J. (Eds). Eriophyoid mites – their biology, natural enemies and control. Amsterdam: Elsevier. pp. 383-396. doi:10.1016/S1572-4379(96)80023-6

Butt S.J. 2005 — Extending the vase life of roses (*Rosa hybrida*) with different preservatives — Int. J. Agr. Biol., 7: 97-99.

Crespel L., Gudin S. 2003 — Evidence for the production of unreduced gametes by tetraploid *Rosa hybrida* L. — Euphytica, 133: 65-69. doi:10.1023/A:1025640405827

de Lillo E., Craemer C., Amrine J.W. Jr., Nuzzaci G. 2010 — Recommended procedures and techniques for morphological studies of Eriophyoidea (Acari: Prostigmata) — Exp. Appl. Acarol., 51: 283-307. doi:10.1007/s10493-009-9311-x

Di Bello P., Ho T., Tzanetakis I.E. 2015 — Rose rosette virus is the causal agent of rosette disease — Acta Hortic., 1064: 295-298. doi:10.17660/ActaHortic.2015.1064.35

Druciarek T., Lewandowski M. 2016 — A new species of eriophyoid mite (Acari: Eriophyoidea) on *Rosa* sp. from Israel — Zootaxa, 4066(3): 323-330. doi:10.11646/zootaxa.4066.3.8

Druciarek T., Lewandowski M., Kozak M. 2014 — Demographic parameters of *Phyllocoptes adalius* (Acari: Eriophyoidea) and influence of insemination on female fecundity and longevity — Exp. Appl. Acarol., 63: 349-360. doi:10.1007/s10493-014-9782-2

Druciarek T., Kozak M., Maroufpoor M., Lewandowski M. 2016 — Morphological variability of *Phyllocoptes adalius* female forms (Acari: Eriophyoidea), with a supplementary description of the species — Syst. Appl. Acarol., 21(2): 181-194. doi:10.11158/saa.21.2.3

El Mokadem H., Meynet J., Jacob Y., Gudin S. 2000 — Utilization of parthenogenetic diploid plants of *Rosa hybrida* L. in interspecific hybridization — Acta Hort., 508: 185-190. doi:10.17660/ActaHortic.2000.508.24

Gu C., Robertson K.R. 2003 — *Rosa* L. — In: Team FoCe (Ed.) Flora of China. St. Louis, MO: Missouri Botanical Garden Press.

Hoy M. 2013 — Eriophyid mite vector of Rose Rosette Disease (RRD) *Phyllocoptes fructiphilus* Keifer (Arachnida: Acari: Eriophyidae) [Internet] — [25 August 2015].

Ji-Wei L., Zhen-Hui W., Xiao-Feng X., Jian-Ping Z. 2015 — Three new species of eriophyoid mites (Acari, Eriophyoidea) from Xinjiang Uygur Autonomous Region, China — ZooKeys, 508: 97-111.

Kamali H., Doryanizadeh N., Ali Akrami M. 2015 — First record of the genus *Acerimina* Keifer (Acari: Eriophyidae) from Iran with description of a new species — Persian Journal of Acarology, 4(1): 65-70.

Keifer H.H. 1939a — Eriophyid Studies IV — Bull. Calif. Dept. Agr., 28: 223-239.

Keifer H.H. 1939b — Eriophyid studies VII — Bull. Calif. Dept. Agr., 28: 484-505.

Keifer H.H. 1940 — Eriophyid Studies VIII — Bull. Calif. Dept. Agr., 29: 21-46.

Keifer H.H. 1972 — Eriophyid Studies C-7 — ARS-USDA: 1-24.

Laney A.G., Keller K.E., Martin R.R., Tzanetakis I.E. 2011 — A discovery 70 years in the making: characterization of the rose rosette virus — J. Gen. Virol., 92: 1727-1732. doi:10.1099/vir.0.031146-0

Lindquist E.E. 1996 — External anatomy and notation of structures. In: Lindquist E.E., Sabelis M.W., Bruin J. (Eds). Eriophyoid mites – their biology, natural enemies and control. Amsterdam: Elsevier. pp. 3-31. doi:10.1016/S1572-4379(96)80003-0

Styer W.E. 1974 —A new species of *Phyllocoptes* (Acari: Eriophyoidae) from rose — Entomol. News, 85: 202-204.

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