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Subscriptions: Year 2021 (Volume 61): 450 €
http://www1.montpellier.inra.fr/CBGP/acarologia/subscribe.php
Previous volumes (2010-2020): 250 € / year (4 issues)
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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First report on the occurrence of *Typhlodromus* (*Anthoseius*) *transvaalensis* (Nesbitt) (Acari: Phytoseiidae) in India with a redescriptions of the species

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Original research

ABSTRACT

This paper reports for the first time the occurrence of *Typhlodromus* (*Anthoseius*) *transvaalensis* (Nesbitt) in India. Morphometric measurements of the Indian specimens collected on an unidentified plant in Ramanagaram district of Karnataka are provided along with a redescriptions of the species, and a comparison with specimens from Japan, Africa, Argentina and La Réunion Island to show similarities and variations in morphological traits of taxonomic importance.

Keywords predatory mites; new record; Karnataka

Introduction

The family Phytoseiidae contains predatory mites used in biological control. It comprises three subfamilies: Amblyseinae, Phytoseiinae and Typhlodrominae. Within the subfamily Typhlodrominae, the genus *Typhlodromus* contains the highest number of species, and is divided into two subgenera, *Typhlodromus* (*Anthoseius*) De Leon and *Typhlodromus* (*Typhlodromus*) Scheuten (Chant and McMurtry 1994, 2007). There are 388 described species of *Typhlodromus* (*Anthoseius*) in the world (Demite et al. 2020).

*Typhlodromus* (*Anthoseius*) *transvaalensis* (Nesbitt), the species reported herein, is widely distributed in many tropical and subtropical parts of the world, viz. Algeria, Australia, Azerbaijan, Brazil, Cameroon, Cape Verde, China, Colombia, Costa Rica, Egypt, Georgia, Guinea, Hawaii, Indonesia, Israel, Jordan, Kenya, New Caledonia, Panama, Philippines, La Réunion Island, Russia, Singapore, South Africa, Taiwan and USA (Moraes et al. 2004; Ueckermann et al. 2008; Demite et al. 2020). Nesbitt (1951) first described this species from ground peanuts in Transvaal (South Africa) and from *Rattus* sp. in Florida, USA. It occurs on a great variety of plants (Muma and Denmark 1970), including sugarcane, *Saccharum officinarum* L., in South Africa (Ueckermann et al. 2008); chilli, *Capsicum annuum* L., and tomato, *Lycopersicon esculentum* Mill., in Argentina (Cédola and Castresana 2014); and ribwort plantain, *Plantago lanceolata* L., and rescuegrass, *Bromus catharticus* Vahl, in La Réunion Island (Kreiter et al. 2020). It was reported in laboratory cultures of mites such as the phytoseiid *Scapulaseius okinawanus* (Ehara) (Ehara and Kishimoto 2007), the pyroglyphid *Dermatophagoides* sp. and the otopheidomenid *Nabiseius* sp. (Prasad 1968). Kreiter et al. (2020) found this species in rearing of *Frankliniellidae* sp. and of unnamed beneficial insects.
in La Réunion Island, while Ueckermann et al. (2008) found it in a *Galleria* sp. colony in Kenya, and on the scale insect *Coccus viridis* (Green) in Cape Verde. The other habitats from where it was recorded earlier are: donkey’s dunghill and chocolates in Israel (Amitai and Swirski 1978), an unlabelled stored commodity in the Philippines (Corpuz-Raros et al. 1988) and soil in South Africa (Ueckermann et al. 2008).

Since the present report of *T. (A.) transvaalensis* is the first from India, morphometric measurements of the Indian specimens collected on an unidentified plant in Ramanagar district of Karnataka are provided along with a redescription of the species. In addition, morphological traits of the Indian specimens are compared with those reported in redescriptions provided by Ehara and Kishimoto (2007), Ueckermann et al. (2008), Cédola and Castresana (2014) and Kreiter et al. (2020) for specimens collected in Japan, Africa, Argentina and La Réunion Island, respectively. All measurements are given in micrometres (µm).

### Systematic account

*Typhlodromus (Anthoseius) transvaalensis* (Nesbitt)

*Kampimodromus* transvaalensis Nesbitt 1951: 55.
*Typhlodromus* transvaalensis, Chant 1955: 498.
*Typhlodromus (Typhlodromus) transvaalensis*, Chant 1959: 60.
*Neoseiulus* transvaalensis, Muma 1961: 295.
*Typhlodromus (Neoseiulus) transvaalensis*, Pritchard & Baker 1962: 222.
*Typhlodromus* transvaalensis, Chant & Baker 1965: 5.
*Clavidromus* transvaalensis, Muma & Denmark 1968: 238.
*Momaseius* transvaalensis, Abbasova 1970: 1410.
*Anthoseius (Anthoseius) transvaalensis*, Wainstein & Vartapetov 1973: 104.
*Typhlodromus (Anthoseius) transvaalensis*, Chant & McMurtry 1994: 252.
*Typhlodromus (Anthoseius) transvaalensis*, Moraes et al. 2004: 355.
*Typhlodromus (Anthoseius) transvaalensis*, Chant & McMurtry 2007: 157.
*Typhlodromus (Anthoseius) transvaalensis*, Ehrara & Kishimoto 2007: 139–143.
*Typhlodromus (Anthoseius) transvaalensis*, Ueckermann et al. 2008: 99–101.
*Typhlodromus (Anthoseius) transvaalensis*, Cédola & Castresana 2014: 61–63.
*Typhlodromus (Anthoseius) transvaalensis*, Kreiter et al. 2020: 183–184.
*Typhlodromus (Anthoseius) jackmickleyi*, De Leon 1958: 75. (synonymized by Muma & Denmark 1968)
*Typhlodromus (Anthoseius) jackmickleyi*, van der Merwe 1968: 23. (synonymized by Muma & Denmark 1968)
*Typhlodromus pectinatus*, Athias-Henriot 1958: 179. (synonymized by Muma & Denmark 1968)

### Female

**Dorsum** — Dorsal shield 345 (343–346) long (from base of seta *j1* up to posterior margin of shield), 200 (196–210) wide (at seta *R1* level), gently reticulate, highly sclerotized with a total of 18 pairs of setae and 4 pairs of solenostomes. All setae, excepting *J5*, *z2* and *S5*, on dorsal shield are long, gently serrated or sparsely plumose and knobbed (Figure 1); *J5* and *S5* are short and smooth with a pointed tip, but *z2* is serrated with a pointed tip. Measurements of setae: *j1* 24 (23–25), *j3* 36 (33–37), *j4* 28 (27–29), *j5* 32 (31–33), *j6* 34 (33–35), *j2* 42 (40–43), *J5* 8 (7–9), *z2* 22 (21–23), *z3* 36 (35–37), *z4* 40 (38–41), *z5* 30 (29–31), *Z4* 51 (50–53), *Z5* 52 (51–53), *s4* 42 (41–43), *s6* 44 (43–45), *S2* 42 (41–43), *S4* 44 (43–45), *S5* 10 (8–10), *r3* 20 (19–21), *R1* 36 (34–37).

**Peritreme** — Peritreme extends anteriorly up to the level of *j3* base and posteriorly gently curves inwards near coxa IV.
Figure 1  *Typhlodromus (Anthoseius) transvaalensis* (adult female): sparsely plumose and knobby setae on the dorsal shield, 630×, differential interference contrast microscopy.

Venter — Sternal shield 130 (128–132) long at the level of *st1–st3*, 78 (77–79) wide at the level of *st3–st3*, with 3 pairs of sternal setae, posterior margin of sternal shield markedly indented medially, sternal setae measure *st1* 24 (22–25), *st2* 26 (25–27), *st3* 26 (25–27). Metasternal plate measures 10 (9–10) long, 4 (3–4) wide with a pair of setae, *st4* 24 (23–24). Genital shield 80 (79–81) wide at the level of posterior margin, *st5* 30 (28–31). Ventrianal shield 115 (112–120) long at the level of *JV1* up to posterior tip of shield, 72 (71–73) wide at the level of *ZV2*, 74 (72–75) wide at the level of anus, with 3 pairs of setae, *JV1* 24 (22–25), *ZV2* 24 (23–24), *JV2* 24 (23–25) with 1 pair of preanal pores. Metapodal plate I 26 (24–27) long, 3 wide, and metapodal plate II 10 (9–10) long, 2 wide. Anal and postanal setae measure 16 (15–17). Ratios of *JV1/JV1*–*JV1* = 0.5, *JV2/JV2*–*JV2* = 0.5, *ZV2/ZV2*–*ZV2* = 0.32. Setae around ventrianal shield *JV1* 24 (22–25), *ZV3* 14 (13–15), *JV4* 14 (13–15), *JV5* 56 (54–57), the latter setae gently serrated with a knobbed tip.

Chelicera — Fixed digit 30 (28–30) long with 2 teeth and a long, thin *pilus dentilis*, movable digit 28 (27–29) long with a barely discernible tooth (Figure 2).

Spermatheca — Calyx 30 (28–31) long, funibuliform, with distal ¼ thick walled, atrium nodular, major duct highly sclerotized, minor duct invisible.

Legs — Leg IV with 3 knobbed macrosetae measuring *Sge IV* 26 (25–27), *Sti IV* 27 (26–28), *St IV 45 (43–46)*. No macrosetae on legs I–III. Leg chaetotactic formula: genu II 2 2/0 2/0 1, tibia II 11/1 2/1 1, genu III 1 2/1 2/0 1, tibia III 11/1 2/1 1.

Male

Not found, probably because this species is known to reproduce by thelytokous parthenogenesis (Kishimoto 2015).
Figure 2  *Typhlodromus (Anthoseius) transvaalensis* (adult female): chelicera, 630×, differential interference contrast microscopy.

**Specimens examined**

Twenty females, India: Karnataka, Ramanagara district, Channapatna taluk (subdivision), Vandaraguppe Horticultural Station (12°41′15.4″ N, 77°14′13.6″ E), on an unidentified plant, 29 November 2019, collected by Prakya Sreerama Kumar, deposited in the Mite Repository of ICAR–National Bureau of Agricultural Insect Resources.

**Discussion**

Table 1 gives a comparison of morphological traits of taxonomic importance for specimens of *T. (A.) transvaalensis* collected in India, Japan, Africa, Argentina and La Réunion Island.

The Indian specimens are the smallest as indicated by the dimensions of dorsal and ventrianal shields. Globally, the Indian specimens have shorter setae, particularly *j1, j3, j4, j6, J2, z2, z3, z4, Z4, Z5, s4, s6, S2, S4, r3 and R1* than specimens collected in other countries. On the contrary, *z5* and *S5* are longer, while *j5* has a similar length.

Although the dorsal setae of Indian specimens are sparsely plumose, they do not look like those of the Argentinian specimens described and illustrated as plumose by Cédola and Castresana (2014). The Indian specimens are similar to the Japanese specimens (Ehara and Kishimoto 2007) in regard to the setae *J5, z2 and S5*, which have a pointed tip.

In regard to the macrosetae of leg IV, the Indian specimens are comparable to that of the African and La Réunionese specimens. It can be concluded that the differences between Indian and other specimens are very likely to correspond to intraspecific variations. It is worth noting that the Indian specimens are closer to the African specimens than to those from other regions.

Forty-one species of the genus *Typhlodromus (Anthoseius)* are reported from India (Demite et al. 2020), and *T. (A.) transvaalensis* is the 42nd species to be added to that list.
Table 1 Comparison of morphological traits of taxonomic importance for specimens of *Typhlodromus (Anthoseius) transvaalensis* collected in India, Japan, Africa, Argentina and La Réunion Island [mean (range) or mean ± SE for Japan; number of specimens in parentheses].

| Part | India (20) (present study) | Japan (10) | Africa (9) | Argentina (3) | La Réunion Island (20) |
|------|-----------------------------|------------|------------|----------------|------------------------|
| j1   | 24 (23–25)                  | 32.8 ± 0.3 | 28 (25–30) | 26 (24–29)     | 28 (25–33)             |
| j3   | 36 (33–37)                  | 42.6 ± 0.4 | 38 (36–40) | 41 (40–43)     | 39 (35–45)             |
| j4   | 28 (27–29)                  | 31.2 ± 0.5 | 30 (26–33) | 32             | 31 (28–36)             |
| j5   | 32 (31–33)                  | 32.3 ± 0.4 | 30 (26–33) | 33 (31–35)     | 32 (30–35)             |
| j6   | 34 (33–35)                  | 38.9 ± 0.5 | 38 (35–41) | 35 (32–38)     | 39 (35–45)             |
| j2   | 42 (40–43)                  | 45.6 ± 0.5 | 44 (40–46) | 48             | 46 (40–50)             |
| j5   | 8 (7–9)                     | 10.7 ± 0.2 | 9 (9–10)   | 8 (7–10)       | 10 (8–13)              |
| z2   | 22 (21–23)                  | 25.6 ± 0.4 | 24 (21–28) | 23 (22–24)     | 25 (23–28)             |
| z3   | 36 (35–37)                  | 40.1 ± 0.3 | 38 (36–40) | 42 (41–43)     | 40 (35–43)             |
| z4   | 40 (38–41)                  | 45.1 ± 0.5 | 41 (39–42) | 45 (43–47)     | 41 (38–45)             |
| z5   | 30 (29–31)                  | 28.6 ± 0.3 | 22 (21–28) | 28 (27–29)     | 28 (25–30)             |
| Z4   | 51 (50–53)                  | 55.5 ± 0.5 | 52 (47–60) | 60 (58–62)     | 58 (53–60)             |
| Z5   | 52 (51–53)                  | 67.1 ± 0.7 | 62 (57–70) | 64 (62–67)     | 65 (58–70)             |
| r4   | 42 (41–43)                  | 49.5 ± 0.4 | 45 (42–49) | 48 (48–49)     | 46 (40–50)             |
| S4   | 44 (43–45)                  | 50.1 ± 0.7 | 49 (46–54) | 52 (51–53)     | 50 (45–53)             |
| S5   | 42 (41–43)                  | 55.9 ± 0.4 | 55 (50–57) | 60 (60–61)     | 56 (53–60)             |
| S4   | 44 (43–45)                  | 57.2 ± 0.7 | 56 (53–56) | 60 (58–62)     | 58 (55–63)             |
| S5   | 10 (8–10)                   | 8.5 ± 0.4  | 9 (8–11)   | 9 (9–10)       | 7 (5–10)               |
| Z4   | 51 (50–53)                  | 55.5 ± 0.5 | 52 (47–60) | 60 (58–62)     | 58 (53–60)             |
| Z5   | 52 (51–53)                  | 67.1 ± 0.7 | 62 (57–70) | 64 (62–67)     | 65 (58–70)             |
| r4   | 42 (41–43)                  | 49.5 ± 0.4 | 45 (42–49) | 48 (48–49)     | 46 (40–50)             |
| S4   | 44 (43–45)                  | 50.1 ± 0.7 | 49 (46–54) | 52 (51–53)     | 50 (45–53)             |
| S5   | 42 (41–43)                  | 55.9 ± 0.4 | 55 (50–57) | 60 (60–61)     | 56 (53–60)             |
| S4   | 44 (43–45)                  | 57.2 ± 0.7 | 56 (53–56) | 60 (58–62)     | 58 (55–63)             |
| S5   | 10 (8–10)                   | 8.5 ± 0.4  | 9 (8–11)   | 9 (9–10)       | 7 (5–10)               |
| Z4   | 51 (50–53)                  | 55.5 ± 0.5 | 52 (47–60) | 60 (58–62)     | 58 (53–60)             |
| Z5   | 52 (51–53)                  | 67.1 ± 0.7 | 62 (57–70) | 64 (62–67)     | 65 (58–70)             |
| r4   | 42 (41–43)                  | 49.5 ± 0.4 | 45 (42–49) | 48 (48–49)     | 46 (40–50)             |
| S4   | 44 (43–45)                  | 50.1 ± 0.7 | 49 (46–54) | 52 (51–53)     | 50 (45–53)             |
| S5   | 42 (41–43)                  | 55.9 ± 0.4 | 55 (50–57) | 60 (60–61)     | 56 (53–60)             |
| S4   | 44 (43–45)                  | 57.2 ± 0.7 | 56 (53–56) | 60 (58–62)     | 58 (55–63)             |
| S5   | 10 (8–10)                   | 8.5 ± 0.4  | 9 (8–11)   | 9 (9–10)       | 7 (5–10)               |
| r3   | 20 (19–21)                  | 37.8 ± 0.4 | 32 (29–35) | 34 (33–35)     | 35 (33–38)             |
| RI   | 36 (34–37)                  | 42.6 ± 0.4 | 40 (38–41) | 45 (44–46)     | 43 (40–48)             |
| Dorsal shield | 345 (334–346) long | 389 ± 6 long | 352 (325–373) long | 376 (360–392) long | 362 (343–395) long |
| Sternal shield | 130 (128–132) long | – | – | – | – |
| Genital shield | 115 (112–120) long | 135.6 ± 2.3 long | 118 (107–130) long | 135 (130–141) long | 124 (115–133) long |
| Ventrianal shield | 72 (71–73) wide (level ZV2), 74 (72–75) wide (level anus) | 83.3 ± 0.6 wide | 76 (73–78) wide (level ZV2), 78 (73–84) wide (level anus) | 80 (73–88) wide (level ZV2), 82 (75–88) wide (level anus) | – |
| Metasternal plate | 10 (9–10) long | – | – | – | – |
| Metapodal plate I | 26 (24–27) long | – | – | – | 30 (23–25) long |
| Metapodal plate I | 3 wide | – | – | – | 3 (3–5) wide |
| Metapodal plate II | 10 (9–10) long | – | – | – | 12 (8–18) long |
| Macrosetae on leg IV | Sge IV: 26 (25–27) | – | Sge IV: 26 (25–26) | – | Sge IV: 26 (23–28) |
| St IV: 27 (26–28) | St IV: 27 (24–29) | | St IV: 28 (25–30) | St IV: 45 (43–46) | St IV: 47 (43–50) |

Sources of data — Japan: Ehara and Kishimoto (2007); Africa (Kenya, Cape Verde & South Africa): Ueckermann et al. (2008); Argentina: Cédola and Castresana (2014); La Réunion Island: Kreiter et al. (2020); – not provided.

Sreerama Kumar P. and Gupta S. K. (2021), *Acarologia* 61(1): 55-61; DOI 10.24349/acarologia/20214417
Typhlodromus (A.) transvaalensis is a type III generalist predator that feeds on mites, insects and pollen (McMurtry et al. 2013). It could complete its life cycle feeding on the eriophyid mites Eriophyes dioscoridis Soliman and Abou-Awad and E. olivi Zaher and Abou-Awad, eggs of the scale insect Parlatoria ziziphus (Lucas) and pollen of Ricinus communis (L.) under experimental conditions (Momen and Hussein 1999). Cañarte et al. (2017) showed that it has high potential to control Polyphagotarsonemus latus (Banks) in Jatropha curcas L. plantations. Mass production and utilization of this species are planned for biological control in India (Gupta and Sreerama Kumar 2018).

Acknowledgements
We thank Mr S. Pandian for processing and slide-mounting the mites. We are also thankful to Dr Jagadeesh Patil for imaging the specimens with Zeiss Axio Imager Z2.

References
Abbasova E.D. 1970. Little known species and a new subspecies of the genus Mumaseius De Leon (Acarina, Phytoseiidae). Zool. Zhurnal, 49: 1410–1414. (In Russian, English summary)
Amatii S., Swirski E. 1978. A new genus and new records of phytoseiid mites (Mesostigmata: Phytoseiidae) from Israel. Isr. J. Entomol., 12: 123–143.
Athias-Henriot C. 1958. Contribution à la connaissance du genre Typhlodromus Scheuten (Parasitiformes, Phytoseiidae). Description de deux espèces nouvelles d’Algérie et clé des espèces du groupe finlandicus. Rev. Pathol. Vég. Entomol. Agric. France, 37: 179–186.
Cédola C., Castresana J. 2014. First record of Typhlodromus (Anthoseius) transvaalensis (Acari: Phytoseiidae) from Argentina. Rev. Soc. Entomol. Argent., 73(1–2): 61–63.
Cañarte E., Sarmento R.A., Venzon M., Pedro-Neto M., Ferreira Jr D.F., Santos F.A., Pallini A. 2017. Suitability and nutritional requirements of the predatory mite Typhlodromus transvaalensis, a potential biological control agent of physic nut pest mites. Biol. Control 115: 165–172. doi:10.1016/j.biocontrol.2017.10.008
Chant D.A. 1955. Notes on mites of the genus Typhlodromus Scheuten (Acari: Phytoseiidae), with descriptions of the males of some species and the female of a new species. Can. Entomol., 87: 496–503. doi:10.4039/Ent87496-11
Chant D.A. 1959. Phytoseiid mites (Acari: Phytoseiidae). Part I. Bionomics of seven species in southeastern England. Part II. A taxonomic review of the family Phytoseiidae, with descriptions of thirty-eight new species. Can. Entomol., 61: 1–166. doi:10.4039/entm61112f
Chant D.A., Baker E.W. 1965. The Phytoseiidae (Acari) of Central America. Mem. Entomol. Soc. Can., 41: 1–56. doi:10.4039/entm9741f
Chant D.A., McMurtry J.A. 1994. A review of the subfamilies Phytoseiinae and Typhlodrominae (Acari: Phytoseiidae). Int. J. Acarology, 20: 223–310. doi:10.1080/01647959408684032
Chant D.A., McMurtry J.A. 2007. Illustrated keys and diagnoses for the genera and subgenera of the Phytoseiidae of the world (Acari: Mesostigmata). West Bloomfield, MI, USA: Indira Publishing House. 219 pp.
Corpuz-Raros L.A., Sabio G.C., Velasco-Soriano M. 1988. Mites associated with stored products, poultry houses and house dust in the Philippines. Philipp. Ent., 7(3): 311–321.
De Leon D. 1958. Four new Typhlodromus from southern Florida (Acarina: Phytoseiidae). The Fla. Entomol., 41: 73–76. doi:10.2307/3492360
Demite P.R., Moraes G.J. de, McMurtry J.A., Denmark H.A., Castilho R.C. 2020. Phytoseiidae Database. Available from: www.lea.esalq.usp.br/phytoseiidae (accessed 12 XI 2020)
Ehara S., Kishimoto H. 2007. The occurrence of Typhlodromus (Anthoseius) transvaalensis (Nesbitt) (Acari: Phytoseiidae) in Japan. J. Acarol. Soc. Jpn., 16(2): 139–143. doi:10.2300/acari.16.139
Gupta S.K., Sreerama Kumar P. 2018. The underestimated worth of predatory and parasitic mites in India: does it really have to import exotic species for biological control? CAB Rev., 13(31): 1–17. doi:10.1079/PAWSR201813031
Kishimoto H. 2015. Development and oviposition of eight native phytoseiid species (Acari: Phytoseiidae) reared on eggs of the Mediterranean flour moth, Ephestia kuehniella Zeller (Lepidoptera: Pyralidae). J. Acarol. Soc. Jpn., 24(2): 71–76. doi:10.2300/jasj.24.2-71
Kreiter S., Payet R.-M., Douin M., Fontaine O., Fillâtre J., Le Belloc F. 2020. Phytoseiidae of La Réunion Island (Acari: Mesostigmata): three new species and two males described, new synonyms, and new records. Acarologia, 60(1): 111–195.
McMurtry J.A., Moraes G.J. de, Sourassou N.F. 2013. Revision of the lifestyles of phytoseiid mites (Acari: Phytoseiidae) and implications for biological control strategies. Syst. Appl. Acarol. 18: 297–320. doi:10.1139/say-2013-04-01
Momen F., Hussein H. 1999. Relationships between food substances, developmental success and reproduction in Typhlodromus transvaalensis (Acari: Phytoseiidae). Acarologia, 40, fasc. 2: 107–111.
Moraes G.J. de, McMurtry J.A., Denmark H.A., Campos C.B. 2004. A revised catalog of the mite family Phytoseiidae. Zootaxa, 434: 1–494. doi:10.11646/zootaxa.434.1.1
Muma M.H. 1961. Subfamilies, genera, and species of Phytoseiidae (Acarina: Mesostigmata). Bull. Florida St. Mus. Biol. Sci., 5: 267–302.
Muma M.H., Denmark H.A. 1968. Some generic descriptions and name changes in the family Phytoseiidae (Acarina: Mesostigmata). Fla. Entomol., 51: 229–240. doi:10.2307/3493424
Muma M.H., Denmark H.A. 1970. Phytoseiidae of Florida. Arthropods of Florida and neighboring land areas, 6. Florida Department of Agriculture and Consumer Services, Division of Plant Industry, Gainesville, Florida, USA, 150 pp.
Nesbitt H.H.J. 1951. A taxonomic study of the Phytoseiinae (Family Laelaptidae) predaceous upon Tetranychidae of economic importance. Zool. Verh., 12: 1–64, 32 plates.
Prasad V. 1968. Amblyseius mites from Hawaii. Ann. Entomol. Soc. Amer., 61: 1514–1521. doi:10.1093/aesa/61.6.1514
Pritchard A.E., Baker E.W. 1962. Mites of the family Phytoseiidae from Central Africa, with remarks on the genera of the world. Hilgardia, 33: 205–309. doi:10.3733/hilg.v33n07p205
Ueckermann E.A., Zannou I.D., Moraes G.J. de, Oliveira A.R., Hanna R., Yaninek J.S. 2008. Phytoseiid mites of the tribe Typhlodromini (Acari: Phytoseiidae) from sub-Saharan Africa. Zootaxa, 1901: 1–122. doi:10.11646/zootaxa.1901.1.1
van der Merwe G.G. 1968. A taxonomic study of the family Phytoseiidae (Acari) in South Africa with contributions to the biology of two species. Entomol. Mem. South Africa Dep. Agric. Techn. Serv., 18: 1–198.
Wainstein B.A., Vartapetov S.G. 1973. Predatory mites of the family Phytoseiidae (Parasitiformes) of Adzharskaya ASSR. Akad. Armian. SSR. Biol. Zh. Arm., 26: 102–105. (In Russian)