

## Nota Científica

### First record of *Tetra magnolivora* in Brazil with a new combination

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#### Index terms:

Eriophyoidea  
Magnoliaceae  
*Magnolia grandiflora*

#### Termos para indexação:

Eriophyoidea  
Magnoliaceae  
*Magnolia grandiflora*

#### Histórico do artigo:

Recebido em 21/03/16  
Aprovado em 18/04/17  
Publicado em 30/06/17

doi: 10.4336/2017.pfb.37.90.1196

**Abstract** - *Tetra magnolivora* (Keifer, 1939) (Acari, Eriophyidae) new combination was observed infesting *Magnolia grandiflora* L., in urban areas of Curitiba, Paraná State, Brazil. This mite was observed in high populations on magnolia trees, causing wrinkles, distortion and decreased growth in infested leaves. This is the first record from Brazil for *T. magnolivora* and we provide new combination.

#### Primeiro registro de *Tetra magnolivora* no Brasil, combinação nova

**Resumo** - *Tetra magnolivora* (Keifer, 1939) (Acari, Eriophyidae), combinação nova, foi observada infestando plantas de *Magnolia grandiflora* L., em áreas urbanas de Curitiba, PR, Brasil. Este ácaro foi observado em altas populações em plantas de magnólia, causando encarquilhamento, distorção e decréscimo de crescimento em folhas infestadas. Este é o primeiro registro para o Brasil de *T. magnolivora* e aqui apresentamos uma nova combinação.

*Magnolia grandiflora* L. (Magnoliaceae) is an evergreen tree with dense and large canopy and white fragrant flowers, to 100 ft. ( $\approx$  30.5 m) and even more in height (Bailey, 1975). It is native to the southeastern USA and has been widely used in urban tree plantings in streets, parks and gardens (Lorenzi et al., 2003).

Because of its larg, white flower, contrasting with its bright green leaves, its main use is as ornamental (Lorenzi et al., 2003); being planted around the world for this purpose (Lanzara & Pizzetti, 1979). Its hard an,

heavy wood is used to make furniture and other uses (Coladonato, 1991) and the leaves, fruits, bark and wood have been used for medicinal purposes (Enciclopedia of life, 2017). The floral essential oils extracts were described as active against human lung carcinoma and breast carcinoma cells (Farag & Al-Mahdy, 2013) and also tested as antioxidant and hepatoprotectant (Sokkar et al., 2014).

Keifer (1939) described *Phyllocoptes magnolivora* (Acari, Eriophyidae) from *M. grandiflora* collected in

San Jose, California, USA. According to Keifer, this mite is unusual in possessing an almost entirely granular shield. The mites live among the hairs (trichomes) on the undersides of the leaves and are also found around the flower buds structures.

Roivainen (1951) renamed this mite as *Vasates magnolivora* (Acari, Eriophyidae) (Keifer, 1939) and confirmed its habitus as living among the natural hairs on the undersides of the leaves on a home-grown magnolia in Finland. The mites are also found around the flower buds but no damage has been attributed to them. Assignment to *Vasates* was also reported by Keifer (1952).

In February, 2016, we observed in Curitiba, Paraná State, Brazil, (geographical coordinates -25.424093 -49.271662) magnolia trees with shriveled leaves. Some leaves were collected manually, observed under an optical microscope, which demonstrated the presence of large numbers of eriophyids mites. The mite observed in high populations in this tree is the same described at the site of plant origin in California, USA, described by Keifer (1939) as *P. magnolivora*.

Although they were not quantified, a large number of mites were observed on buds and the abaxial face of the leaves. In new leaves, still not fully developed, the mites were present also in the adaxial face. These mites were collected, stored in Keifer's liquor and sent to Prof. Carlos H.W. Flechtmann, at the laboratory of Entomology of the University of São Paulo. After initial observations under a stereoscopic microscope, by Flechtmann, specimens were transferred to Keifer's Liqueur (Isopropyl alcohol 25 mL, water 60 mL, sorbitol 30 g, a dash of KI and two iodine crystals) and later mounted in BDTA, modified Berlese's medium (Amrine Junior & Manson, 1996), and deposited in the collection of the University of São Paulo. Photographs and measurements were taken and sent to taxonomist James W. Amrin Jr., West Virginia University.

Dr. Amrine compared the photos with mounted slides and descriptions in the literature, with specimens collected in USA and with the type material of "*Aculops magnolivora*" (Acari, Eriophyidae). After this comparison it was clear that it was the same species. Also this mite collect in *M. grandiflora* from Curitiba is the same described at the site of plant origin in California, USA, by Keifer (1939) as *Phyllocoptes magnolivora* Keifer, 1939. So, it was clear that it is Keifer's "*Aculops magnolivora*" (Acari, Eriophyidae), and that it should be

reassigned to *Tetra* (Figures 1a, 1b and 1c), and hereafter designated *Tetra magnolivora* (Keifer, 1939) (Acari, Eriophyidae), new combination.



Photos: J. W. Amrine Junior

**Figures 1.** *Tetra magnolivora* (Keifer, 1939). A. Female, ventral; B. Female dorsal; C. Male, ventral. Weak lateral ridges are visible on the dorsal opisthosoma in Figure 1b.

The characteristics for the diagnosis for the genus are: opisthosoma with a broad, shallow trough bounded by narrow lateral ridges (Amrine Junior et al., 2003, p.128). Descriptions of *Tetra magnolivora* (Keifer, 1939) (Acari, Eriophyidae, new combination) is detailed in Keifer, 1939, as *Phyllocoptes magnolivora* (Acari, Eriophyidae).

*Tetra magnolivora* (Keifer, 1939) new combination  
*Phyllocoptes magnolivora* Keifer, 1939

*Vasates magnolivora* (Keifer, 1939; Roivainen, 1951).  
*Aculops magnolivora* (Keifer, 1939); Keifer, 1966.

Relationship to thost: The mite was recorded as living among the pubescence on the undersurface of the leaves of *M. grandiflora* and occasionally around the flower buds causing no apparent damage (Keifer, 1939, 1952). It was first collected in Clarke Co., Georgia, USA, in 1961 (Davis, 1964). In 2015, we found a high infestation in *M. grandiflora*, in McDonough, Henry Co., Georgia, USA, that caused yellowing, browning and premature leaf drop. Outside its region of origin it was reported from Italy (Bernini et al., 1995) and Finland (Roivainen, 1951). In Curitiba, Brazil we found large populations of

the mites causing shriveling, distortion and decrease in size of the leaves of *M. grandiflora*.

Known Distribution: Italy; Finland; USA and now in Brazil (Table 1). The mite probably occurs in many other areas where the plant is grown.

**Table 1.** Geographic data for *Tetra magnolivora* (Keifer, 1939) (Acari, Eriophyidae) on *Magnolia grandiflora* L. around the world.

Synonymy	Reference	Country
<i>Phyllocoptes magnolivora</i> Keifer, 1939	Keifer (1939)	USA
<i>Vasates magnolivora</i> (Keifer, 1939)	Roivainen (1951)	Finland
<i>V. magnolivora</i> (Keifer, 1939)	Keifer (1952)	USA
<i>V. magnolivora</i> (Keifer, 1939)	Davis (1964)	USA
<i>Aculops magnolivora</i> (Keifer, 1939)	Keifer (1966)	USA
<i>A. magnolivora</i> (Keifer, 1939)	Keifer (1967)	USA
<i>A. magnolivora</i> (Keifer, 1939)	Amrine & Stasny (1994)	USA
<i>A. magnolivora</i> (Keifer, 1939)	Bernini et al. (1995)	Italy
<i>A. magnolivora</i> (Keifer, 1939)	Castagnoli (1996)	Italy
<i>A. magnolivora</i> (Keifer, 1939)	Baker et al. (1996)	USA
<i>Tetra magnolivora</i> (Keifer, 1939)	new record	USA
<i>T. magnolivora</i> (Keifer, 1939) new combination	new record	Brazil

Other eriophyids known to occur on *M. grandiflora* are *Davisella breitlowi* (Davis, 1964) (Acari, Diptilomiopidae), vagrant on leaves undersides in Florida, Georgia and West Virginia, USA, apparently causing no symptoms; and an undescribed *Aceria* sp. (Acari, Eriophyidae) found among hairs on margins and tips of young leaves in West Virginia, USA, not causing any symptoms (Amrine & Stasny, 1994). Other *Tetra* known to occur on *Magnolia* are *Tetra kingi* Styer, 1975, on *M. acuminata* L. in Ohio and West Virginia, USA, and on *M. tripetala* L. in Ohio, USA (Styer, 1975); and *Tetra magnolifoliae* Keifer, 1963 on *M. virginiana* L. in Maryland, USA (Keifer, 1963) (Amrine & Stasny, 1994); these *Tetra* are vagrants on leaf undersides and are not known to cause injury.

## References

Amrine, J. W. & Stasny, T. A. **Catalog of the Eriophyoidea (Acarina: Prostigmata) of the world**. Michigan: Indira Publishing House, 1994. 798 p.

Amrine Junior, J. W. & Manson, D. C. M. Preparation, mounting and descriptive study of eriophyoid mites. In: Lindquist, E. E. et al. (Ed.). **Eriophyoid mites: their biology, natural enemies and control**. Amsterdam: Elsevier, 1996. p. 383-396. (World crop pests, 6). DOI:10.1016/S1572-4379(96)80023-6.

Bailey, L. H. **Manual of cultivated plants**: most commonly grown in the continental United States and Canada. New York: MacMillan, 1975. 1116 p.

Baker, E. W. et al. **Eriophyoid mites of the United States**. West Bloomfield: Indira Publishing House, 1996. 394 p.

Bernini, F. et al. Arachnida Acari. In: Minelli, A. et al. (Ed.). **Checklist delle specie della fauna italiana**. Bologna: Calderini, 1995. v. 24. p. 1-131.

Castagnoli, M. Ornamental coniferous and shade trees. In: Lindquist, E. E. & Sabelis, M. W. (Ed.). **Eriophyoid mites: their biology, natural enemies and control**. Amsterdam: Elsevier, 1996. (World crop pests, 6). DOI: 10.1016/S1572-4379(96)80044-3.

Coladonato, M. *Magnolia grandiflora*. In: FIRE effects information syste. [Logan]: U.S. Department of Agriculture, U. S. Forest Service, Rocky Mountain Research Station, 1991. Available from: <http://www.fs.fed.us/database/feis/>. Access in: 6 Mar. 2017.

Davis, R. Some Eriophyid mites occurring in Georgia with descriptions of tree new species. **The Florida Entomologist**, v. 47, n. 1, p. 17-27, 1964.

Enciclopedia of life. **Magnolia grandiflora**: Southern Magnolia. Available from: <http://eol.org/pages/1154991/details>. Access in: 6 Mar. 2017.

Farag, M. A. & Al-Mahdy, D. A. Comparative study of the chemical composition and biological activities of *Magnolia grandiflora* and *Magnolia virginiana* flower essential oils. **Natural Product Research**. v. 27, n. 12, p. 1091-1097, 2013. DOI: 10.1080/14786419.2012.696256.

Keifer, H. H. **Eriophyid studies B-9**. California: Department of Agriculture, Bureau of Entomology, 1966. 20 p.

Keifer, H. H. **Eriophyid studies B-21**. California: Department of Agriculture, Bureau of Entomology, 1966. 24 p.

Keifer, H. H. Eriophyid studies VII. **The Bulletin Department of Agriculture State of California**, v. 28, n. 7-9, p. 484-505, 1939.

Keifer H. H. The Eriophyid mites of California (Acarina, Eriophyidae). **Bulletin of California Insect Survey**, v. 2, n. 1, p. 1-128, 1952.

Lanzara, P. & Pizzetti, M. **Guia de arboles**. Barcelona: Grijalbo, 1979. 299 p.

Lorenzi, H. et al. **Árvores exóticas no Brasil: madeireiras, ornamentais e aromáticas**. Nova Odessa: Instituto Plantarum de Estudos da Flora, 2003. 368 p.

Roivainen, H. Contribution to the knowledge of the Eriophyids of Finland. **Acta Entomologica Fennica**, v. 8, p. 1-72, 1951.

Sokkar, N. M. et al. Determination of flavonoids in stamen, gynoecium, and petals of *Magnolia grandiflora* L. and their associated antioxidant and hepatoprotection activities. **Química Nova**, v. 37, n. 4, p. 667-671, 2014. DOI: 10.5935/0100-4042.20140106.

Styer, W. E. New species of Eriophyid mites (Acari: Eriophyoidea) from Ohio. **Annals of the Entomological Society of America**, v. 68, n. 5, p. 833-841, 1975.

