

Scientific Note

New records of *Rileyia hegeli* Girault, 1916 (Hymenoptera, Eurytomidae) from Brazil

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Edited by: Daniel Aquino

Received: July 15, 2022. Accepted: October 05, 2022. Published: October 26, 2022.

Abstract. *Rileyia hegeli* Girault, 1916 (Hymenoptera, Eurytomidae) was previously known in USA, Mexico, Guatemala, Costa Rica, Dominican Republic, Jamaica, Venezuela and, in Brazil, in the states of Minas Gerais and Rio Grande do Sul. Here, we newly report this species from the Brazilian municipalities of Alto Paraíso de Goiás, in Goiás state, Brazil, obtained through collections with Malaise traps, of Ribeirão Preto and Águas de São Pedro, in São Paulo state, reared from leaf galls of *Eugeniomyia dispar* Maia, Mendonça & Romanowski, 1996 (Diptera, Cecidomyiidae) on *Eugenia uniflora* L. (Myrtaceae) and of Palhoça, in Santa Catarina state, reared from galls of an unidentified Cecidomyiidae gall-maker in fruits of *E. uniflora*. Additionally, we provide a map with the geographical distribution of the studied species based on the new records and literature.

Keywords. Chalcidoidea, distributional range expansion, *Eugenia uniflora*, *Eugeniomyia dispar*, parasitic wasp.

Rileyia Ashmead, 1888 (Hymenoptera, Eurytomidae, Rileyinae) comprises currently 65 species from Holarctic, Australasian and Neotropical regions; the genus is most speciose in the Neotropics, primarily in Central and South Americas where it includes 57 species, 13 of them with recorded occurrence for Brazil (Gates 2008; Noyes 2019; Perioto et al. 2020).

Rileyia hegeli Girault, 1916 acts as a solitary ectoparasitoid of the leaf gall maker *Eugeniomyia dispar* Maia, Mendonça & Romanowski, 1996 (Diptera, Cecidomyiidae) on the Surinam cherry, known in Brazil as pitangueira, *Eugenia uniflora* L. (Myrtaceae) (Fig. 1) (Gates 2008).

Eugeniomyia dispar is reported as one of the limiting factors to the cultivation of *E. uniflora* trees, mainly in plant nurseries, where abiotic factors such as rain and temperature and biotics such as parasitism and predation occur in lower intensity than in natural conditions (Salles 1995; Bierhals et al. 2012). Each female of *Eu. dispar* can lay up to 30 eggs placed, preferably, close to the petiole and the main vein of new leaves of *E. uniflora*; after emergence, its larvae penetrate the leaf tissue, which induces the formation of galls (Maia et al. 1996; Mendonça & Romanowski 2002; Bianchia et al. 2018) resulting from hypertrophy of plant tissues triggered by a single galling larva (Mendonça & Romanowski 2002). At the end of the late larval stage, larvae of *Eu. dispar* leave the galls to pupate in the soil, from which the adults emerge (Bierhals et al. 2012).

Females of *R. hegeli* (Fig. 2) insert the ovipositor into the galls and lay an egg on the last instar larvae of *Eu. dispar*. After hatching, *R. hegeli* larvae settle on the host and feed on it and, at the end of the larval cycle, pupate inside the gall. To emerge, the adults open a small hole in the gall wall with their mandibles through which they exit into the external environment (N.W. Perioto personal communication).

The parasitism of *R. hegeli* is also reported in unidentified cecidomyiids in *Coccoloba diversifolia* Jaqc. and *Gymnopodium floribundum* Rolfe (Polygonaceae), in galls on leaves of *Piper* sp. (Piperaceae), and in galls on flowers of *Leucaena pulverulenta* (Schlect.) (Fabaceae) (Gates 2008). There's likely a new host for *R. hegeli*. Recently Dr. Tiago G. Pikart (Universidade do Estado de Santa Catarina) sent to the first author specimens of *R. hegeli* from the municipality of Palhoça, in the state of Santa Catarina, reared on galls in fruits of *E. uniflora*. According to Dr. Valéria Cid Maia (Universidade Federal do Rio de Janeiro / Museu Nacional) (personal communication), the

galls in fruits of *E. uniflora* are conical and different from the foliar galls caused by *Eu. dispar* and are induced by a not yet identified species of Cecidomyiidae.



Figure 1. Young plant of *Eugenia uniflora* L. (Myrtaceae) with galls produced by *Eugeniomyia dispar* Maia, Mendonça & Romanowski, 1996 (Diptera, Cecidomyiidae). In detail, abaxial leaf face.

In the Brazilian territory, *E. uniflora* occurs in various physiographic formations such as Caatinga, Brazilian savanna and Atlantic rainforest (Bourscheid et al. 2011) and is widely cultivated in domestic backyards (Lorenzi et al. 2006). In Brazil, the commercial cultivation of this fruit tree, both for *in natura* consumption and for the industrial preparation of sweets, jams, ice cream, juices, etc has been carried out mainly in the states of Pernambuco, Bahia and Rio Grande do Sul (Silva 2006; Alavoura 2016).

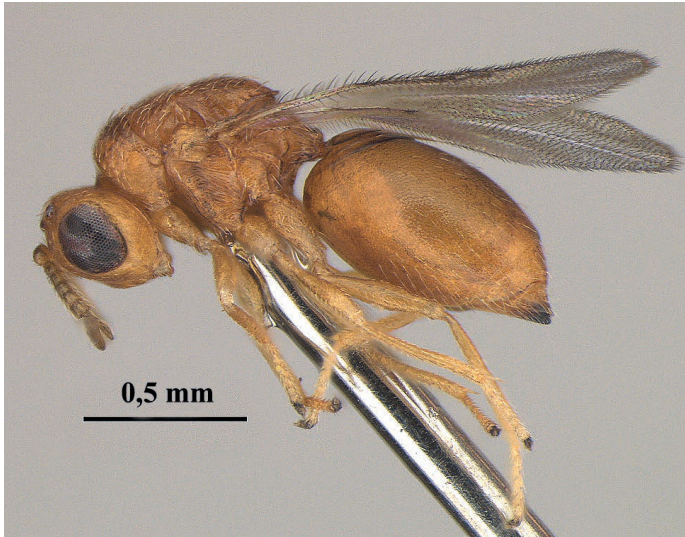


Figure 2. *Rileya hegeli* Girault, 1916 (Hymenoptera, Eurytomidae), female. Habitus.

Our knowledge about the geographical distribution of *R. hegeli* is far from complete. *Rileya hegeli* has been described by A. A. Girault based on one female collected by W. H. Ashmead from Biscaine Bay, Florida, USA (Girault 1916) and has wide geographic distribution, with occurrence records for the USA (Texas, Florida), Mexico, Guatemala, Costa Rica, Dominican Republic, Jamaica, Venezuela and, in Brazil, in the states of Minas Gerais and Rio Grande do Sul (Gates 2008; Noyes 2019).

There are no formal records of the occurrence of *R. hegeli* in the Brazilian states of Goiás, São Paulo and Santa Catarina. Thus, we present the first records of *R. hegeli* for those states based on specimens collected with Malaise trap in a Brazilian savanna vegetation area in Alto Paraíso de Goiás (Goiás state), on specimens reared from galls produced by *Eu. dispar* in leaves of *E. uniflora* collected in Ribeirão Preto and Águas de São Pedro (São Paulo state), and specimens reared from an unidentified species of Cecidomyiidae that causes galls in fruits of *E. uniflora* collected in Palhoça (Santa Catarina state) (Fig. 3).

The studied specimens were deposited at Coleção Entomológica do Laboratório de Sistemática e Bioecologia de Predadores e Parasitoides of the Instituto Biológico (LRRP), in Ribeirão Preto (N.W. Perioto, curator) and at Coleção de Insetos Entomófagos “Oscar Monte” of the Centro Avançado de P&D em Sanidade Agropecuária, Instituto Biológico (IB-CBE), in Campinas (V.A. Costa, curator), both in the state of São Paulo, Brazil.

Rileya hegeli was identified using the key provided by Gates (2008).

Observations were carried out using a Leica SAPO stereomicroscope with 10X oculars under led light source.

Digital images of a young plant of *E. uniflora* with galls produced by *Eu. dispar* were taken using the camera of a mobile phone Motorola Moto G 50.

Digital images of *R. hegeli* were taken using a Leica MC170 HD digital camera coupled to a Leica M205C APO stereomicroscope. The specimen was illuminated with a Leica LED5000 HDI high diffuse dome illumination. The digital images were combined using Helicon Focus (version 8.1.0) software to obtain a single image in extended focus. The figures were prepared using Adobe Photoshop (version 11.0) software.

The provided map with the geographical distribution of *R. hegeli* was generated with the Simplemappr tool (Shorthouse 2010) and is based on data from literature and new records.

Abbreviation used: Gtn (n = number of tergum) = gastral terga.

The information on the labels of the examined specimens has been transcribed in the examined material section as follows: the backslash symbol (\) indicates the different lines on the label and two quotation marks (”) indicate different labels on the same specimen.



Figure 3. Geographic distribution of *Rileya hegeli* Girault, 1916 (Hymenoptera, Eurytomidae) (open red circles= known records, solid red circles= new records).

Rileya hegeli Girault, 1916

Rileya hegeli Girault, 1916: 340-341.

Rileya compressiventris Gahan, 1918: 143-144.

Figs. 1-3

New records. Alto Paraíso de Goiás, Goiás state, Brazil, Ribeirão Preto and Águas de São Pedro, São Paulo state and Palhoça, Santa Catarina state (Fig. 3).

Examined material. “BRA[zil], GO[iás], Alto Paraíso de Goiás \ PAR[que]NA[acional] Chapada dos Veadeiros \ 14°07'44"S / 47°44'04" W \ cerrado / arm. Malaise \ 5 / VI / 2018 \ N.W. Perioto & R.I.R. Lara, cols.”, “*Rileya hegeli* \ Girault, 1916 \ Perioto, N.W. det., 2020”, 1 female (LRRP # 21112); same data except: 9 / X / 2018, 1 female (LRRP # 21111); same data except: 25 / IX / 2018, 2 females (LRRP # 21109-21110); “BRA[zil], S[ão]P[aulo], Ribeirão Preto \ 21°10'42"S / 47°50'42" W \ ex. galhas foliares em *Eugenia \ uniflora* (Myrtaceae) \ 19 / V / 2022 \ N.W. Perioto e eq., cols.”, “*Rileya hegeli* \ Girault, 1916 \ Perioto, N.W. det., 2022”, 13 females, 8 males (LRRP # 22763-22781); “BRASIL, SP, Águas de São Pedro \ [22°35'58"S, 47°52'33"W] \ Ex *Eugeniomyia dispar* em *Eugenia uniflora* \ E. Berti Filho, 24.ii.2017”, “*Rileya hegeli* \ Girault \ Det. V.A. Costa, 2017”, 3 females (IB-CBE 003705-003707); “BRA[zil], S[anta]C[atarina], Palhoça \ Praia do Sonho, 27°50'27,35"S / 48°35'29,63" W \ ex. galhas em frutos de pitanga \ 23 / I / 2016 \ T.G. Pikart, col.”, 1 female, 2 males (LRRP # 22885-22887).

Identification. According to Gates (2008), *R. hegeli* can be distinguished from all other known species of the genus by presenting the following set of combined characters: fine intrascrobal carina present and extending for a distance of half the length of scape; Gt1-3 occupying less than one-quarter length of gaster with Gt1 almost 1.5x as long as Gt2-3 (Figs. 198, 199, 204 in Gates 2008); stigma slightly enlarged posteriorly (Fig. 201 *ibiden*).

These new records extend the geographic range of *R. hegeli* to Alto Paraíso de Goiás, in the state of Goiás, to Ribeirão Preto and Águas de São Pedro, in the state of São Paulo and to Palhoça, in the state of Santa Catarina, about 5,600, 6,200 and 6,800 km southeast of the type locality, respectively (Fig. 3). Considering that *E. uniflora* occurs in various physiographic formations such as Caatinga, Brazilian

savanna and Atlantic rainforest (Bourscheid et al. 2011) and is a widely cultivated plant in Brazil (Lorenzi et al. 2006), it is expected that *R. hegeli* is distributed throughout much of the Brazilian territory.

Acknowledgments

The authors thank the Instituto Nacional de Ciência e Tecnologia dos Hymenoptera Parasitoides (proc. 65562/2014-0), the Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP) (grants numbers 2017/50334-3 and 2018/18965-6), Dr. Tiago G. Pikart (Universidade do Estado de Santa Catarina) for the specimens obtained in that state and Dr. Valéria Cid Maia (Universidade Federal do Rio de Janeiro / Museu Nacional) for the informations about the galls found in *E. uniflora* fruits.

Authors' Contributions

N.W.P. and V.A.C. identified the Eurytomidae; all authors planned, contributed with the writing, preparation of distribution maps, edition and revision of the final manuscript.

Conflict of Interest Statement

The authors declare no potential conflict of interest.

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