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New records of mealybugs (Hemiptera: Pseudococcidae) infesting rosettes of Conilon coffee plants in the state of Rondônia, South-Western Amazon, Brazil

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Conilon or Robusta coffee (*Coffea canephora* Pierre ex Froehner) (Rubiaceae) represents 25% of all production of coffee in Brazil. The state of Rondônia, located in the Brazilian Amazon, is the third largest producer of this commodity in the country, with an annual production of 2.18 million 60-kg bags (CONAB 2018). Mealybugs (Hemiptera: Pseudococcidae) are among the principal pest insects of Conilon coffee plants in the country (Fornazier et al. 2015). These insects infest mainly the inflorescence and rosette, and are grouped into the category known as “mealybugs of the rosette complex.” Members of this group reported to be associated with Conilon coffee in Brazil include *Planococcus minor* (Maskell), *Planococcus citri* (Maskell), *Pseudococcus elisae* Borchsenius, and *Dysmicoccus grassii* (Leonardi) (all Hemiptera: Pseudococcidae), and have been reported to occur in the state of Espírito Santo (Culik et al. 2006; Fornazier et al. 2015). In the state of Rondônia, the first report of a mealybug found on rosettes of Conilon coffee was *Planococcus* sp. (Teixeira & Costa 2005). These pseudococcids feed on phloem, which can weaken the plant, often causing die-back and fall of flower buds as well as fruits, and resulting in a reduction in production (Santa-Cecília et al. 2005, 2007). Although the effects of *P. citri* mealybugs on Conilon coffee are unknown, Santa-Cecília et al. (2007) reported that high populations of *P. citri* can result in losses of up to 100% in Arabica coffee.

Recently (principally for the last 5 annual harvests), outbreaks of mealybugs associated with inflorescences and rosettes of Conilon coffee have been increasing in Rondônia, leading to an increase in production cost and a decrease in yield of coffee plants cultivated in this state (Costa et al. 2009; CONAB 2016). The objective of this study was to document what species of mealybugs were associated with infested rosettes of Conilon coffee plants grown in the state of Rondônia in the Brazilian Amazon.

One random manual sample was obtained from rosettes of Conilon coffee plants in Rondônia on each of 4 farms located in the municipality of Rolim de Moura (11.5824°S, 61.7697°W; 11.7563°S, 61.7338°W; 11.8564°S, 61.7364°W) during Oct 2016, and in the municipality of Nova Brasilândia d'Oeste (11.7303°S, 62.2119°W) during Nov 2016. Samples were collected from coffee plants in each location when pseudococcids were present at the beginning of fructification (small fruit stage).

Samples were placed in 70% ethyl alcohol and later mounted on microscope slides following the methodology described by Gullan (1984). Scales were identified according to the morphological characteristics of females using the taxonomic keys of Cox and Freeston (1985) for *Planococcus* spp., and Kaydan and Gullan (2012) for *Ferrisia* spp. Voucher specimens were deposited in the Reference Collection of Insects and Mites, at the Department of Plant Protection of Faculdade de Ciências Agrárias e Veterinárias, Universidade Estadual Paulista.

Ferrisia dasyliirii (Cockerell) (Hemiptera: Pseudococcidae) were collected from 2 coffee crops in Rolim de Moura and in 1 crop from Nova Brasilândia d'Oeste. *Planococcus minor* was collected from 2 crops in Rolim de Moura. This is the first record of *F. dasyliirii* associated with a host plant of the family Rubiaceae, and *P. minor* associated with *C. canephora*, in the state of Rondônia.

Among the species in the genus *Ferrisia*, *F. kondoi* Kaydan & Gullan (Hemiptera: Pseudococcidae) has been reported previously from Colombia on *Coffea arabica* L. (Rubiaceae) (Kaydan & Gullan 2012; García Morales et al. 2016), whereas *F. virgata* (Cockerell) (Hemiptera: Pseudococcidae) was recorded on *Coffea* spp. in Zambia (Kaydan & Gullan 2012), *C. arabica* in Kenya (James 1933), and *C. canephora* in Uganda (De Lotto 1964), as well as the state of Espírito Santo, Brazil (Culik et al. 2011).

Ferrisia dasyliirii was described from specimens collected on *Dasyliirion wheeleri* S. Wats. (Asparagaceae) in New Mexico, USA (Cockerell 1896). This species occurs mainly in the Neotropical region, but it also has been recorded in Hawaii (USA) and Malaysia. This mealybug is polyphagous and has been recorded in 57 species of host plants distributed in 28 families. Although the occurrence of this species already has been recorded in Brazil, its distribution and host plants are unknown (Kaydan & Gullan 2012; García Morales et al. 2016). The elongate oval body of adult females of *F. dasyliirii* is approximately 4 mm in length, covered by a white mealy wax. There are 2 dorsolongitudinal submedial bare areas. The lateral filaments are long and vitreous, typical of *Ferrisia* species, and a pair of conspicuous caudal wax filaments are about half as long as the body (Cockerell 1896; Miller et al. 2014; Sartiani et al. 2016) (Fig 1A-E).

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Planococcus citri and *P. minor* are difficult to distinguish at the morphological level (Santa-Cecília et al. 2005). Cox and Freestone (1985) developed an identification key, with maximum and minimum scores, to separate these 2 species, but according to Rung et al. (2008) molecular analysis often is necessary to confirm identification. In Brazil, mealybugs collected in rosettes of *Coffea* spp. prior to 2002 were reported as *P. citri* (Gallo et al. 2002). However, Santa-Cecília et al. (2002) verified that *P. minor* was the most common species associated with rosettes of *C. arabica* in Castelo, Espírito Santo. In the state of Rondônia, a “rosette mealybug” was reported first in *C. canephora* plants by Teixeira and Costa (2005) and identified as *Planococcus* sp.

Planococcus minor, about 5 mm in length, is identical in appearance to *P. citri*, with an oval body slightly rounded in lateral view, covered by a powdery white secretion and with a central longitudinal line devoid of wax. There are 17 or 18 waxy lateral filaments, most relatively short, often slightly curved, the posterior pair slightly longer, about one-eighth of the body length (Miller et al. 2014) (Fig. 1F). Due to the great similarity between the 2 species, new collections of *Planococcus* associated with *Coffea* spp. in Brazil should be gathered to clarify their identity in the different regions, including an intensification of sampling in the state of Rondônia.

Damage caused by *F. dasyliirii* in coffee crops is similar to that of *Planococcus* spp. (Fig. 1A-D), previously considered the principal mealybug associated to rosettes in the state of Rondônia. Thus, outbreaks of

mealybugs recently reported by other authors in several regions of the state and lacking specific identification (Costa et al. 2009; CONAB 2016) may have been *F. dasyliirii*, because they are similar to *Planococcus* spp. in size and shape (Fig. 1E-F). We suggest that extensive monitoring and further studies on frequency and seasonality of the rosettes mealybug complex (including their natural enemy guilds) are necessary in order to develop good management practices against these coffee pests in the future.

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Summary

Ferrisia dasyliirii (Cockerell) and *Planococcus minor* (Maskell) (Hemiptera: Pseudococcidae) were recorded for the first time infesting rosettes of *Coffea canephora* Pierre ex Froehner (Rubiaceae) in the state of Rondônia, Brazil. *Ferrisia dasyliirii* was observed in coffee crops in the municipalities of Rolim de Moura and Nova Brasilândia d'Oeste, and *P. minor* only in Rolim de Moura. *Ferrisia dasyliirii* is reported for the first time on a host plant of the Rubiaceae family.

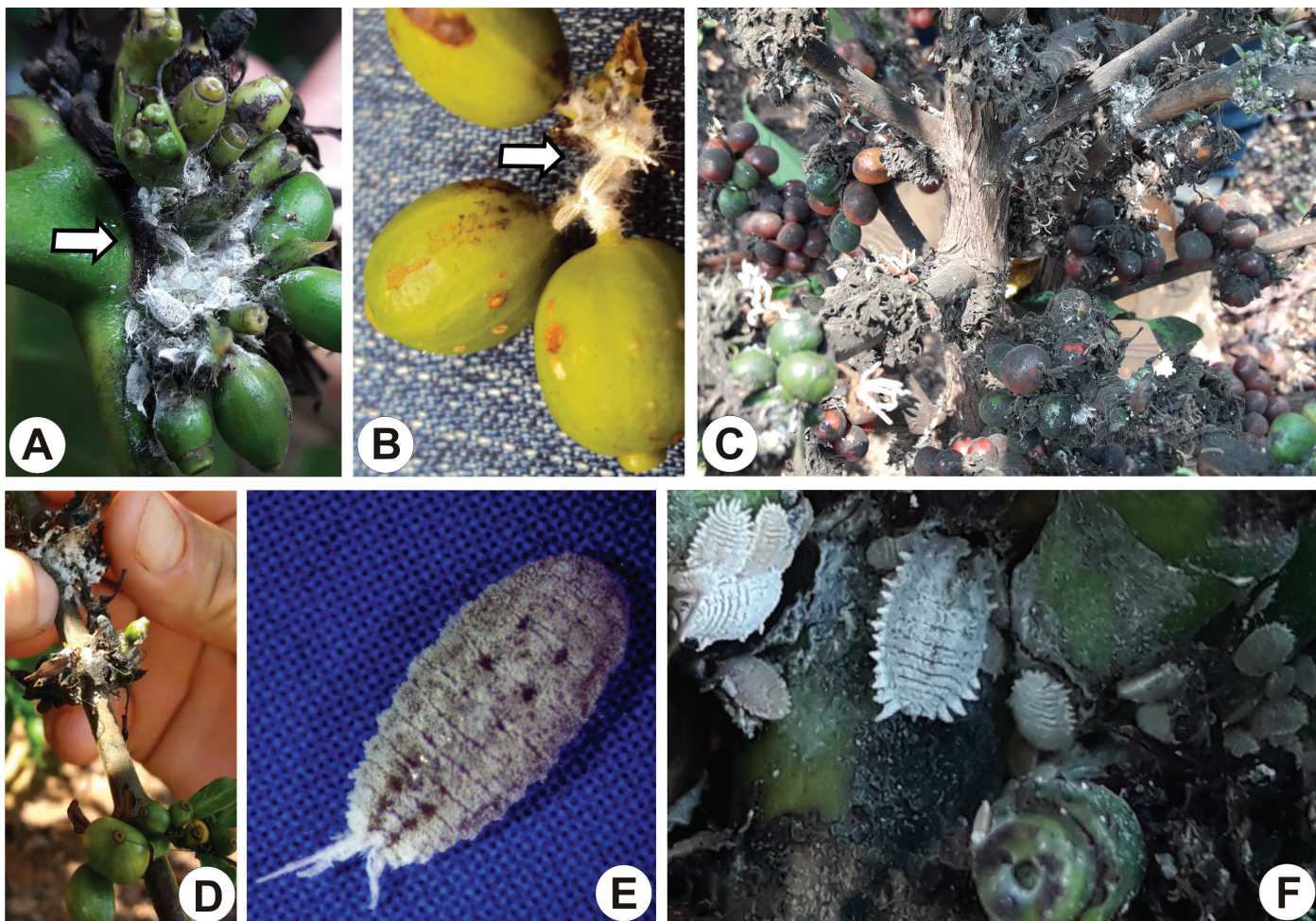


Fig. 1. *Ferrisia dasyliirii* and *Planococcus minor* in rosettes of Conilon coffee trees in the state of Rondônia, South-Western Amazon, Brazil. (A-B) Colonies of *F. dasyliirii* on peduncles of coffee fruits. (C) Fruits covered by sooty mold on top of *F. dasyliirii* honeydew. (D) Branch with damage (scattered grain) of *F. dasyliirii*. (E) Dorsal view of an *F. dasyliirii* adult female. (F) Immatures and adult females of *P. minor*. Photos (A-C) and (E-F) Rondelli VM; (D) Dias JRM.

Key Words: *Ferrisia dasyliirii*; *Planococcus minor*; rosette mealybug; coffee pests; scale insects; insect-plant interaction

Sumário

Ferrisia dasyliirii (Cockerell) e *Planococcus minor* (Maskell) (Hemiptera: Pseudococcidae) foram registradas pela primeira vez infestando rosetas de *Coffea canephora* Pierre ex Froehner (Rubiaceae) no Estado de Rondônia, Brasil. *Ferrisia dasyliirii* foi observada em lavouras de café nos municípios de Rolim de Moura e Nova Brasilândia d'Oeste, e *P. minor* apenas em Rolim de Moura. *Ferrisia dasyliirii* é registrada pela primeira vez em uma planta hospedeira da família Rubiaceae.

Palavras Chave: *Ferrisia dasyliirii*; *Planococcus minor*; cochonilha-da-roseta; pragas do café; cochonilha; interação inseto-planta

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