

Research article

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The Coccinellidae (Coleoptera) from El Hierro, Canary Islands

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Abstract. In this study, Coccinellidae were collected and observed at 42 sites located on El Hierro (Spain), the westernmost island of the Canary archipelago, during 2017 and 2019 excursions. A total of 1553 specimens belonging to 18 species were recorded, of which four species are newly reported from El Hierro. The total number of ladybird species so far documented to inhabit El Hierro is 22. After examination of the morphological features *Scymnus cercyonides* Wollaston, 1864 is transferred from the subgenus *Pullus* Mulsant, 1846 to *Mimopullus* Fürsch, 1987. *Chilocorus canariensis* Crotch, 1874 and *Novius canariensis* Korschefsky, 1935 are confirmed to be valid species.

Key words. Spain, West Palaearctic, ladybird beetles, new records, endemic species.

INTRODUCTION

The Canary Islands are situated in the northeast Atlantic Ocean near the African coast and belong to the Mediterranean Basin biodiversity hotspot (Myers et al. 2000). They have a subtropical climate strongly influenced by the humid trade winds, with temperatures showing little seasonal variation: mean temperature in winter is 18 °C and in summer 24 °C (Juan et al. 2000; Espadaler 2007). The fauna of the Canary Islands is characterized by a high level of endemism. For example, among the Canarian invertebrates endemism is estimated at about 50% (Juan et al. 2000).

The fauna of Coccinellidae of the Canary Islands has a long history of exploration pioneered by Wollaston (1864) and summarized by Eizaguirre (2007) and Oromi et al. (2010). More than 50 species of ladybird beetles were reported from the archipelago. The highest numbers of species were reported from Gran Canaria (42) and Tenerife (41) (Eizaguirre 2007; Oromi et al. 2010; Suarez et al. 2018, Romanowski et al. 2020a), large islands, well-known for their concentration of endemic diversity (Reyes-Betancort et al. 2008). However, Coccinellidae were not deeply investigated on all islands of the archipelago, and only 18 species have so far been reported from El Hierro (Franz 1995; Oromi et al. 2010). Recent study by Romanowski et al. (2018, 2019) nearly doubled

number of ladybird species reported from Fuerteventura and indicated that this eastern island of the Canary archipelago was less prospected than central islands such as Tenerife and Gran Canaria. This study aims to provide new information on species richness of ladybird beetles of El Hierro.

MATERIAL AND METHODS

El Hierro is the westernmost and also the smallest (269 km²) and geologically youngest island of the Canary archipelago, formed by volcanic eruptions approximately 1.1 million years ago (Fernández-Palacios & Whittaker 2008). A wide range of natural habitats can be found on the island (Fig. 1) along with decorative plants sustained by irrigation that grow in parks, hotel grounds and gardens. Due to a well-preserved biological diversity, since 2000 El Hierro has the status of a biosphere reserve.

Coccinellidae were collected and observed at 42 sites on El Hierro between 28 January and 2 February 2017 and between 6 and 12 April 2019. Study sites were located along the coast and inland of the island (Table 1). The beetles were mostly shaken down from various trees and shrubs on a 1 m × 1 m white beating sheet and were swept from ground cover with a net. Some ladybirds were picked from vegetation after direct observation.



Fig. 1. Habitats surveyed for ladybird beetles on El Hierro. **A.** Halophile vegetation. **B.** Junipers *Juniperus* sp. in Sabinar. **C.** Pine forest. **D.** Agricultural land.

The voucher specimens collected by J. Romanowski and C. Zmuda are stored in the insect collection at the Institute of Biological Sciences, Cardinal Stefan Wyszyński University in Warsaw and those collected by J. Krátký and J. Pelikán are deposited in private collection of Jaroslav Větrovec.

The nomenclature of ladybird beetles, unless specifically discussed, follows Kovář (2007), and systematic arrangement follows Ślipiński (2007) and Seago et al. (2011). List of synonyms is provided only for species which were not mentioned in the previous works (Romanowski et al. 2019; Romanowski et al. 2020b).

RESULTS

During the research, a total of 1553 Coccinellidae specimens (1545 imagines, 3 pupae, and 5 larvae) belonging to 18 species were recorded, of which four are new to El Hierro. Below, the data on the recorded species are provided together with supplementary photographic infor-

mation on the identification of several species of special interest.

List of taxa found on El Hierro during this study

Coccinellinae Latreille, 1807

Chilocorini Mulsant, 1846

Chilocorus canariensis Crotch, 1874

Fig. 2A–F

Material examined. Valverde (30.I.2017), 1 ex. (leg. J. Krátký); Las Puntas (29.I.2017), 2 exx. (leg. J. Krátký); El Chirgo (29.I.2017), 1 ex. (leg. J. Pelikán); Tamaduste (30.I.2017), 1 ex. (leg. J. Krátký); Árbol Garoé, Echedo, El Juan, El Mocanal, Guarazoca, Hoya del Morcillo, La Caleta, La Dehesa, Las Playas, Mirador de Isora, Montaña de la Casilla, Pozo de las Calcosas, Punto de la Dehesa, Sabinar, Tigaday, Valverde (6–12.IV.2019), total of 57 exx. (55 adults, 2 larvae) collected from various

Table 1. Collecting sites of ladybird beetles on El Hierro.

No.	Location	Coordinates
1	Árbol Garoé	27°47'22"N 17°56'35"W
2	Camino de Jinama	27°45'12"N 17°59'28"W
3	Charco Menso	27°50'52"N 17°55'24"W
4	Cueva de Don Juste	27°38'54"N 17°59'31"W
5	Echedo	27°50'03"N 17°55'22"W
6	El Chirgo	27°45'04"N 18°03'06"W
7	El Greeting	27°44'22"N 18°04'56"W
8	El Juan	27°42'46"N 18°02'53"W
9	El Mocanal	27°49'14"N 17°56'41"W
10	El Pinar	27°41'43"N 17°58'35"W
11	El Sabinal	27°43'48"N 18°07'14"W
12	El Tiñor	27°47'21"N 17°56'03"W
13	El Tomillar	27°43'28"N 18°06'23"W
14	Eremita de San Salvador	27°43'56"N 18°00'37"W
15	Guarazoca	27°48'35"N 17°58'24"W
16	Hoya del Morcillo	27°42'51"N 17°59'49"W
17	Isora	27°45'09"N 17°56'51"W
18	La Caleta	27°48'03"N 17°53'14"W
19	La Dehesa	27°43'47"N 18°08'30"W
20	La Restinga	27°38'29"N 17°58'55"W
21	Las Playas	27°43'04"N 17°57'31"W
22	Las Puntas	27°47'31"N 17°59'29"W
23	Malpaso	27°43'43"N 18°02'26"W
24	Mirador de Isora	27°44'19"N 17°57'04"W
25	Mirador de Jinama	27°45'46"N 17°58'50"W
26	Mirador de las Playas	27°43'57"N 17°58'22"W
27	Montaña de Cascaja	27°47'24"N 17°58'21"W
28	Montaña de la Casilla	27°43'15"N 17°58'50"W
29	Montaña de Masilva	27°43'51"N 17°59'31"W
30	Montaña de Mercadel	27°42'39"N 18°01'17"W
31	Montaña del Gajo	27°43'44"N 17°59'29"W
32	Montaña del Lajura	27°40'41"N 17°58'48"W
33	Pista del Derrabado	27°44'27"N 18°03'51"W
34	Pozo de la Salud	27°45'22"N 18°06'14"W
35	Pozo de las Calcosas	27°50'23"N 17°56'48"W
36	Punto de la Dehesa	27°45'59"N 18°07'48"W
37	Sabinar	27°44'55"N 18°07'37"W
38	Sabinosa	27°44'51"N 18°05'51"W
39	San Andres	27°46'06"N 17°57'53"W
40	Tamaduste	27°49'30"N 17°53'44"W
41	Tigaday	27°45'06"N 18°01'36"W
42	Valverde	27°48'38"N 17°54'52"W

plants, including *Yucca* sp., *Euphorbia* sp., *Juniperus* sp., *Nerium oleander* L. (leg. J. Romanowski and C. Zmuda).

Distribution. Endemic Canarian species.

Remarks. Wollaston (1864) examined specimens of this species from the Canary Islands and stated that they belong to the common European species *Ch. renipustulatus* (Scriba, 1790). However, Crotch (1874) in his revision of the ladybird beetles of the world, recognized it as a separate species. Since that time various authors treated it as a subspecies of *Ch. renipustulatus* (Franz 1995; Eizaguirre 2007; Nicolas 2010; Nicolas & Rae 2012) or as a distinct species (Kovář 2007; Hernández et al. 2009). To confirm the status of the Canarian specimens we compared the genitalia of both sexes with those of *Ch. renipustulatus* collected in Poland (Fig. 2G–K). Without a doubt, *Ch. canariensis* should be treated as a distinct, endemic Canarian species, and *Ch. renipustulatus* should be excluded from the list of ladybird beetles of the Canary Islands.

Differential diagnosis. *Chilocorus canariensis* can be separated externally from *Ch. renipustulatus* by the shape of red maculae on elytra (Fig. 2A). In *Ch. canariensis* elytral maculae form a transverse band in the central part of each elytron, while in *Ch. renipustulatus* maculae are almost rounded with a regular border. Differences in male genitalia: in *Ch. canariensis* penis guide asymmetrical (Fig. 2D–E), about as long as parameres, parameres shortly setose, apex of penis with screw-shaped carina with more dense coils (Fig. 2F); in *Ch. renipustulatus* penis guide symmetrical (Fig. 2I–J), distinctly shorter than parameres, parameres with longer setae, apex of penis with screw-shaped carina more loose (Fig. 2K). Differences in female genitalia: in *Ch. canariensis* (Fig. 2C) spermatheca with apical projection more sclerotized and twice longer than in *Ch. renipustulatus* (Fig. 2H).

***Parexochomus nigripennis* (Erichson, 1843)**

Material examined. Las Puntas (29.I.2017), 1 ex. (leg. J. Krátký).

Distribution. Reported from all islands of the Canary archipelago excluding La Palma (Eizaguirre 2007; Oromí et al. 2010). Outside of the Canary Islands known from Algeria, Egypt, Libya, Tunisia, Morocco, Iran, Italy, Portugal, Spain, Saudi Arabia, United Arab Emirates, Iran, Pakistan and India (Poorani 2002; Kovář 2007; Biranvand et al. 2017; Abied et al. 2018; Lakhali et al. 2018).

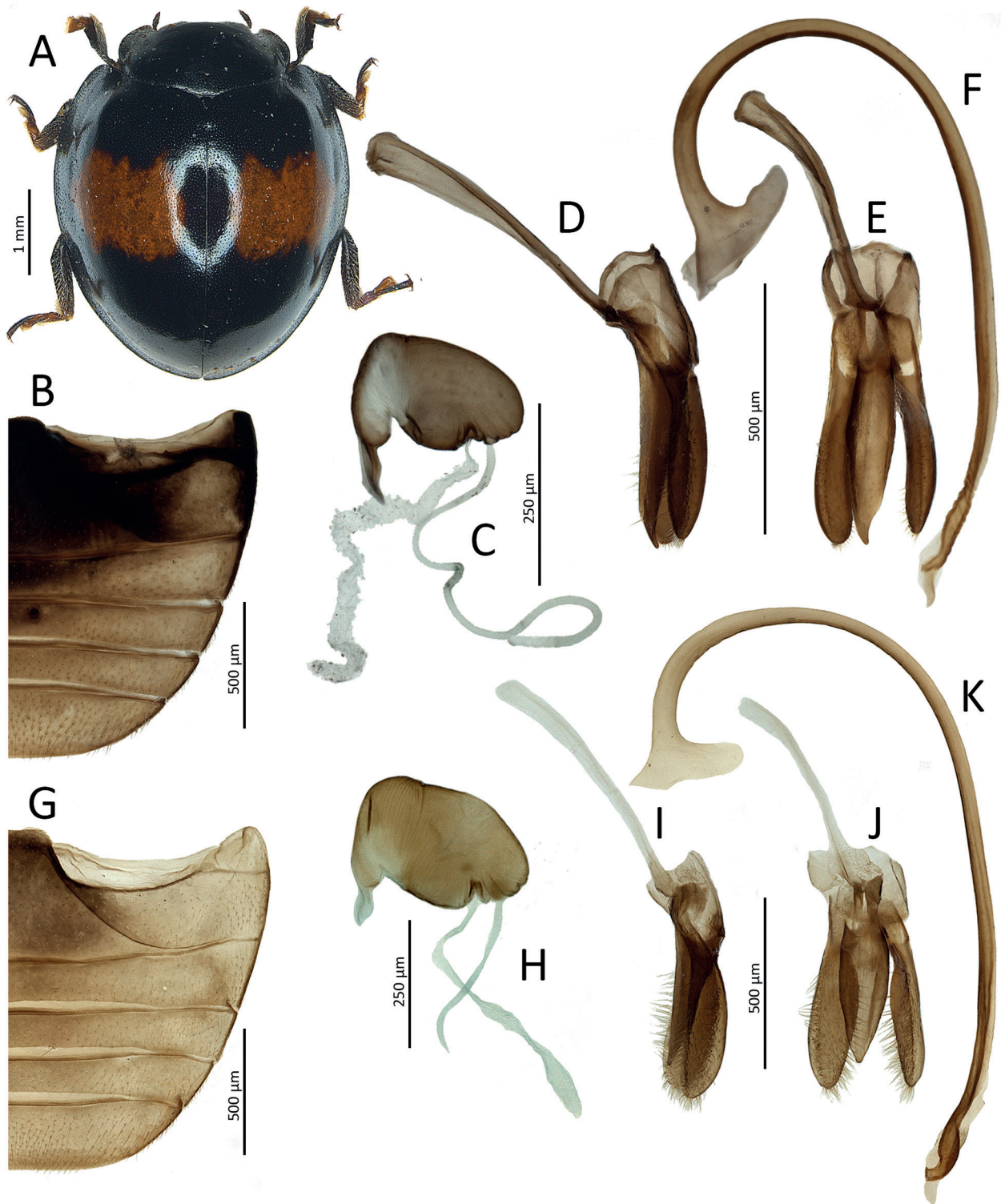


Fig. 2. A–F. *Chilocorus canariensis* Wollaston. A. Habitus. B. Abdomen, male. C. Spermatheca, spermduct and accessory gland. D. Tegmen, lateral. E. Tegmen, inner. F. Penis, lateral. G–K. *Chilocorus renipustulatus* (Scriba). G. Abdomen, male. H. Spermatheca, spermduct and accessory gland. I. Tegmen, lateral. J. Tegmen, inner. K. Penis, lateral.

Coccidulini Mulsant, 1846***Cryptolaemus montrouzieri* Mulsant, 1853**

Material examined. Echedo (12.IV.2019), 1 ex. on *N. oleander*; Tamaduste (11.IV.2019), 1 ex. on *Bougainvillea* sp. (leg. J. Romanowski and C. Zmuda).

Distribution. An Australian species spread throughout the world (Kairo et al. 2013). Reported from all Canary Islands (Eizaguirre 2007; Oromí et al. 2010; Romanowski et al. 2019, 2020b).

***Nephus flavopictus* (Wollaston, 1854)**

Fig. 3G

Material examined. Pozo de la Salud (28.I.2017), 1 ex. (leg. J. Krátký); El Pinar (31.I.2017), 1 ex. (leg. J. Pelikán) from *Euphorbia* sp.; El Tiñor (1.II.2017), 1 ex. (leg. J. Pelikán); Pozo de las Calcosas, Charco Menso, Cueva de Don Juste, El Mocanal, El Tomillar. Guarazoca, Isora, La Caleta, La Restinga, Pozo de la Salud, Sabinar, Tamaduste, Tigaday, Valverde (7–12.IV.2019), total of 96 exx. collected from various plants, including *Euphorbia* sp., *Juniperus* sp., *Yucca* sp., *N. oleander*, *Pistacia lentiscus* L. and *Bougainvillea* sp. (leg. J. Romanowski and C. Zmuda).

Distribution. Endemic Macaronesian species, reported from the Canary Islands (Fürsch 1987; Eizaguirre 2007; Oromí et al. 2010), the Azores (Fürsch 1966, 1987; Soares et al. 2003a) and Madeira (Bielawski 1963; Fürsch 1987; Soares et al. 2003b).

Remarks. Two *N. flavopictus* specimens collected at El Monacal have a distinct color form depicted in Fig. 3G. In this form the black markings on the light area of the elytra are missing (for comparison with typically colored individuals see fig. 5K in Romanowski et al. 2019).

***Nephus (Nephus) incisus* (Har. Lindberg, 1950)**

Material examined. La Restinga (8.IV.2019), 11 exx. on *N. oleander* and *Hibiscus* sp.; Montaña del Lajura (8.IV.2019), 2 exx. on *Euphorbia* sp.; Tamaduste (11.IV.2019), 1 ex. on *Euphorbia* sp. (leg. J. Romanowski and C. Zmuda).

Distribution. Endemic Canarian species (Oromí et al. 2010; Romanowski et al. 2019, 2020). By some authors (Fürsch 1987; Eizaguirre 2007; Nicolas 2010) erroneously reported under the name *Nephus peyerimhoffi* (Sicard, 1923) (Romanowski et al. 2019). New to El Hierro.

***Rhyzobius litura* (Fabricius, 1787)**

Material examined. Sabinar (8.IV.2019), 1 ex. on *Juniperus* sp. (leg. J. Romanowski and C. Zmuda).

Distribution. Palaearctic species (Kovář 2007), reported from all the Canary Islands (Eizaguirre 2007; Oromí et al. 2010).

***Rhyzobius lophanthae* (Blaisdell, 1892)**

Material examined. El Mocanal (9.IV.2019), 1 ex.; El Tomillar (7.IV.2019), 1 ex.; Guarazoca (9.IV.2019), 20 exx.; Las Playas (12.IV.2019), 2 exx.; La Restinga (8.IV.2019), 1 ex.; Mirador de Isora (12.IV.2019), 2 exx.; Tigaday (07.IV.2019), 1 ex., collected mostly from *Cycas* sp., *Phoenix canariensis* H. Wildpret, *Hibiscus* sp. and *Yucca* sp. (leg. J. Romanowski and C. Zmuda).

Distribution. Widely distributed species of Australian origin, known from all Canarian Islands (Eizaguirre, 2007).

***Scymnus (Pullus) canariensis* Wollaston, 1864**

Fig. 3F

Material examined. Pozo de la Salud (28.I.2017), 6 exx. (leg. J. Krátký), 2 exx. (leg. J. Pelikán); Sabinosa (28.I.2017), 2 exx. (leg. J. Krátký); Pista del Derrabado (23.I.2017), 1 ex. (leg. J. Krátký); El Chirgo (28.I.2017), 6 exx. (leg. J. Krátký), (29.I.2017), 7 exx. (leg. J. Pelikán); Las Playas (1.II.2017), 2 exx. (leg. J. Krátký); Tamaduste (30.I.2017), 1 ex. (leg. J. Krátký), Camino de Jinama (31.I.2017), 1 ex. (leg. J. Pelikán); Cueva de Don Juste, Echedo, El Juan, El Mocanal, El Sabinal, El Tomillar, Guarazoca, Hoya del Morcillo, Isora, La Caleta, La Dehesa, La Restinga, Las Playas, Mirador de Isora, Montaña de la Casilla, Montaña del Lajura, Pozo de la Salud, Pozo de las Calcosas, Punto de la Dehesa, Sabinar, Tamaduste, Tigaday, Valverde (7–12.IV.2019), total of 901 exx. collected from various plants including *Pinus canariensis* C. Smith, *Juniperus* sp., *N. oleander*, *Prunus dulcis* (Mill.) D.A. Webb, *Casuarina equisetifolia* L., *Hibiscus* sp., *Ph. canariensis*, *Euphorbia* sp., *Hedera* sp. and *Yucca* sp. (leg. J. Romanowski and C. Zmuda).

Distribution. *Scymnus canariensis* has been considered an endemic Canarian species, known from all islands of the archipelago (Eizaguirre 2007). However, recently it was also reported from São Tomé and Príncipe, and Senegal (Houunkpati et al. 2020).

Remarks. On El Hierro, *S. canariensis* has a distinct color form, which is depicted on Fig. 3F. It was already emphasized by Wollaston (1864) that the occurrence of this form (named by him *S. canariensis* var. β) is limited

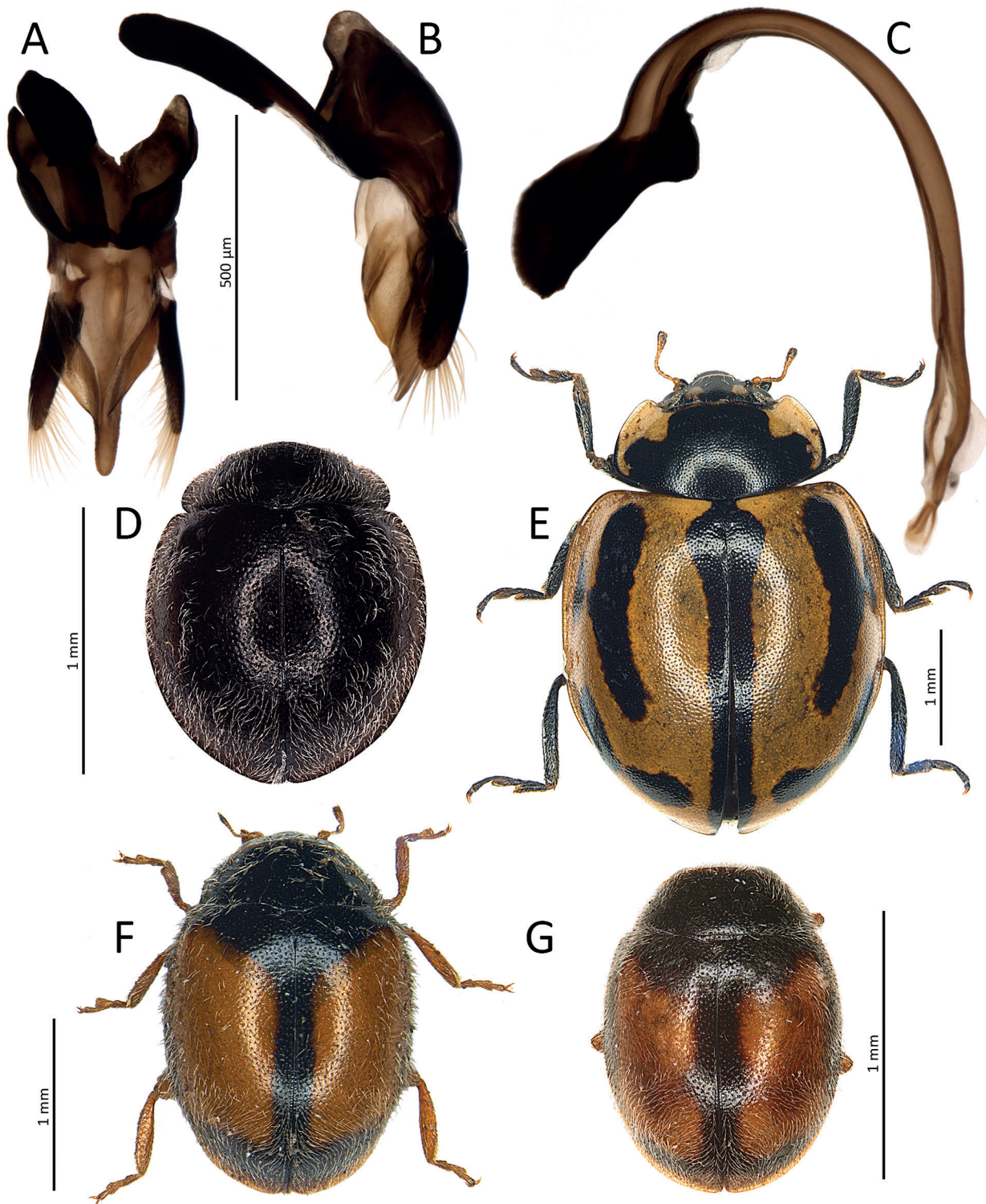


Fig. 3. A–C. *Coccinella miranda* Wollaston. A. Tegmen, inner. B. Tegmen, lateral. C. Penis, lateral. D. *Pharoencymnus decemplagiatus* (Wollaston), habitus of untypically colored specimen from El Hierro. E. *Coccinella miranda* Wollaston, habitus. F. *Scymnus canariensis* Wollaston, habitus of El Hierro color form. G. *Nephus flavopictus* (Wollaston), habitus of untypically colored specimen from El Hierro.

to El Hierro. Male genitalia in this form agree with those of *S. canariensis* from other islands of the archipelago (e.g., Romanowski et al. 2019).

***Scymnus (Mimopullus) cercyonides* Wollaston, 1864
new combination**

Fig. 4A–I

Material examined. El Chirgo (28.I.2017), 5 exx. (leg. J. Krátký) from *Euphorbia* sp., 1 ex. (leg. J. Pelikán); Sabinosa (29.I.2017), 2 exx. (leg. J. Krátký), 1 ex. (leg. J. Pelikán); Eremita de San Salvador (31.I.2017), 1 ex. (leg. J. Krátký) from *Laurus* sp.; El Mocanal (9.IV.2019), 1 ex. from *Hibiscus* sp.; El Tomillar (7.IV.2019), 1 ex. from *Ficus carica* L.; Sabinar (8.IV.2019), 1 ex. from *Juniperus* sp. (leg. J. Romanowski and C. Zmuda).

Distribution. The species reported from western and central Canary Islands (Eizaguirre 2007; Oromí et al. 2010).

Remarks. Male genitalia of our specimens (Fig. 4D–F) are identical with the lectotype drawn by Fürsch (1987). Species frequently misidentified with *Scymnus marinus* Mulsant, 1850. So far it was assigned to the subgenus *Pullus* Mulsant, 1846. However, based on the short carinae on prosternal process, complete and recurved post-coxal abdominal lines (Fig. 4A), and antennae consisting of 11 antennomeres, with a club composed of 4 antennomeres (Fig. 4H), we transfer this species to the subgenus *Mimopullus* Fürsch, 1987.

***Scymnus (Scymnus) nubilus* Mulsant, 1850**

Material examined. Sabinosa (28.I.2017), 1 ex. (leg. J. Krátký); Las Playas (12.IV.2019), 5 exx. on *N. oleander* (leg. J. Romanowski and C. Zmuda).

Distribution. Reported from all the islands of the Canary archipelago except La Palma (Oromí et al. 2010; Romanowski et al. 2019, 2020b). Species widely distributed in the Mediterranean and Middle Eastern regions (Kovář 2007). Recorded also in Pakistan (Gilgit-Baltistan) (Ashfaq et al. 2015), India (Poorani & Lalitha 2018) and Nepal (Bielawski 1972).

***Stethorus tenerifensis* Fürsch, 1987**

Material examined. Eremita de San Salvador (31.I.2017), 1 ex. (leg. J. Pelikán); Echedo, El Mocanal, El Sabinal, El Tomillar, Isora, La Caleta, La Dehesa, La Restinga, Las Playas, Mirador de Isora, Pozo de las Calcosas, Sabinar, Tamaduste, Tigaday, Valverde (7–12.IV.2019), total of 132 exx. collected from various plants

including *Juniperus* sp., *P. canariensis*, *Euphorbia* sp., *N. oleander*, *Ph. canariensis*, *Yucca* sp., *Punica granatum* L. and *F. carica* L. (leg. J. Romanowski and C. Zmuda).

Distribution. Endemic species, known from all Canarian Islands (Eizaguirre 2007; Oromí et al. 2010; Romanowski 2020b).

Coccinellini Latreille, 1807

***Coccinella miranda* Wollaston, 1864**

Fig. 3A–C, E

Material examined. El Greeting (29.I.2017), 1 ex. (leg. J. Krátký); Montaña del Gajo (30.I.2017), 2 exx. (leg. J. Krátký); El Pinar (30.I.2017), 1 ex. (leg. J. Krátký); El Tomillar, Malpaso, Mirador de las Playas, Montaña de la Casilla, Montaña de Masilva, Montaña de Mercadel, Pozo de la Salud, Sabinar (6–11.IV.2019), total of 99 exx. (98 adults, 1 larva) collected from *P. canariensis* (leg. J. Romanowski and C. Zmuda).

Distribution. Endemic Canarian species, reported from Tenerife, La Gomera, La Palma, Gran Canaria and Fuerteventura (Eizaguirre 2007; Oromí et al. 2010). The occurrence on Fuerteventura was not confirmed in a recent study (Romanowski et al. 2019). New to El Hierro.

***Coccinella septempunctata algerica* Kovář, 1977**

Material examined. El Pinar (30.I.2017), 2 exx. (leg. J. Krátký); El Juan, El Mocanal, Hoya del Morcillo, Isora, Las Playas, Mirador de Isora, Mirador de Jinama, Montaña de la Casilla, Pozo de la Salud, San Andres (06–12.IV.2019), total of 67 exx. (66 adults, 1 larva) collected from *P. canariensis*, *Tamarix* sp., *N. oleander* and herbaceous plants (leg. J. Romanowski and C. Zmuda).

Distribution. This Palaearctic species inhabits all seven Canarian islands (Eizaguirre 2007; Oromí et al. 2010).

***Myrrha octodecimguttata* (Linnaeus, 1758)**

Material examined. Árbol Garoé (9.IV.2019), 2 exx. from *P. canariensis*; El Tomillar (7.IV.2019), 1 ex. from *P. canariensis* (leg. J. Romanowski and C. Zmuda).

Distribution. Palaearctic species (Kovář 2007), reported so far from two Canarian islands, La Gomera (Eizaguirre 2007; Oromí et al. 2010) and Gran Canaria (Romanowski et al. 2020a). New to El Hierro.

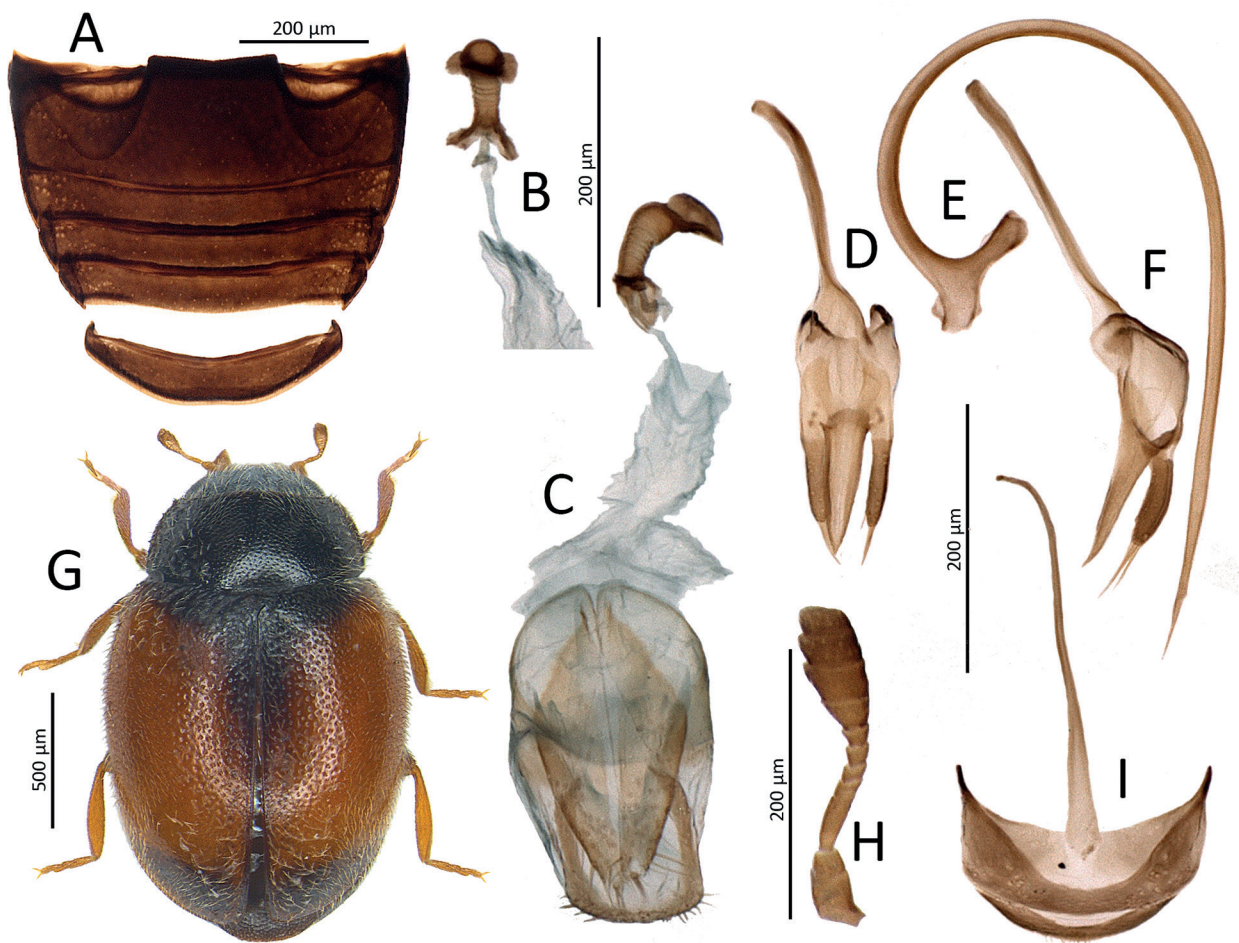


Fig. 4. *Scymnus (Mimopullus) cercyonides* Wollaston. **A.** Abdomen, male. **B.** Spermatheca. **C.** Female genitalia, bursa copulatrix, spermduct and spermatheca. **D.** Tegmen, inner. **E.** Penis, lateral. **F.** Tegmen, lateral. **G.** Habitus. **H.** Antenna. **I.** Male abdominal segments IX and X.

Hippodamia variegata (Goeze, 1777)

Material examined. Isora (12.IV.2019), 1 ex. from *P. granatum*; Montaña de Cascaja (9.IV.2019), 1 ex. from herbaceous vegetation; Pozo de la Salud (7.IV.2019), 4 exx. (3 pupae and 1 larva) from herbaceous vegetation; San Andres (11.IV.2019), 1 ex. from herbaceous vegetation (leg. J. Romanowski and C. Zmuda).

Distribution. The species is widely distributed in the Palearctic, Afrotropical and Oriental regions, and inhabits all seven Canarian islands (Eizaguirre 2007; Oromí et al. 2010).

Noviini Mulsant, 1846

Novius canariensis Korschevsky, 1935

Fig. 5A–F, L

Material examined. Árbol Garoé (9.IV.2019), 1 ex. from *Juniperus* sp.; El Sabinal (7.IV.2019), 1 ex. from *Juniperus* sp.; Mirador de Isora (12.IV.2019), 3 exx. from *Euphorbia* sp.; Tigaday (7.IV.2019), 1 ex. from *Juniperus* sp. (leg. J. Romanowski and C. Zmuda).

Distribution. Endemic Canarian species, known from Tenerife and Gran Canaria (Eizaguirre 2007; Oromí et al. 2010). New to El Hierro.

Remarks. There were some doubts about the validity of this species. Forrester (2008) wrote that she was unable to find and examine the type series of *N. canariensis* collected on Gran Canaria. However, Korschevsky (1935) drew the habitus of that species, which perfectly fits to our specimens collected on El Hierro (Fig. 5L). To check, whether *N. canariensis* is a distinct species, its male genitalia were compared with the genitalia of mainland *N. cruentatus* (Mulsant, 1846) collected in Poland

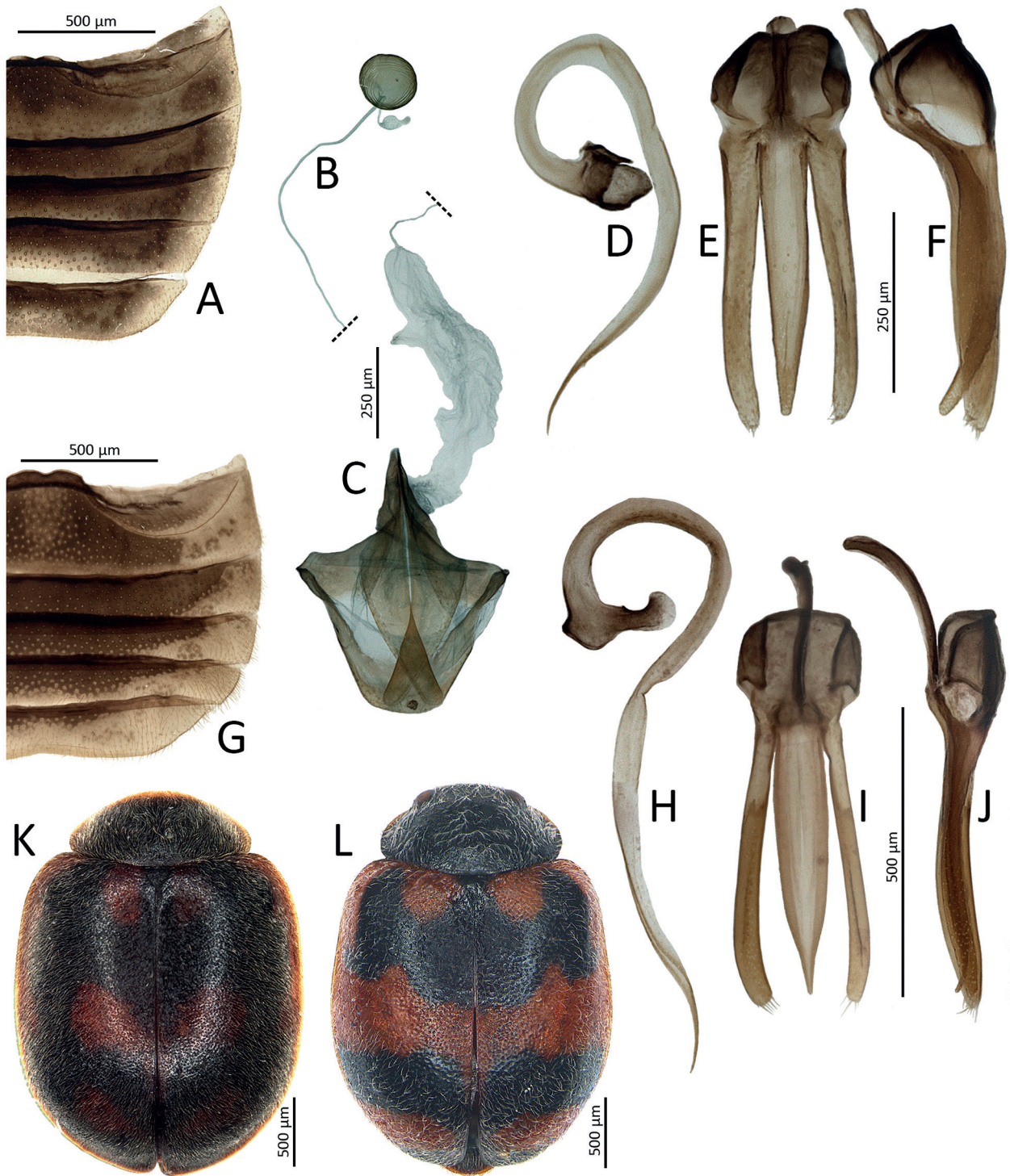


Fig. 5. A–F. *Novius canariensis* Korshefsky. A. Abdomen, male. B. Spermatheca. C. Female genitalia and bursa copulatrix. D. Penis, lateral. E. Tegmen, inner. F. Tegmen, lateral. G–J. *Novius cruentatus* (Mulsant). G. Abdomen, male. H. Penis, lateral. I. Tegmen, inner. J. Tegmen, lateral. K. *Novius cruentatus*, habitus. L. *Novius canariensis*, habitus.

(Fig. 5G–K). Our investigation confirms that the Canarian species is clearly different from *N. cruentatus*.

Differential diagnosis. *Novius canariensis* (Fig. 5L) can be separated externally from *N. cruentatus* (Fig. 5K) by the shape of red maculae on elytra. In *N. canariensis* the central part of elytra is occupied by a complete transverse band, whereas in *N. cruentatus* there are two small red, rounded maculae on each elytron, one close to the lateral margin, second close to sutural line. Sometimes these maculae are larger but they never form complete transverse band. Differences in male genitalia: in *N. canariensis* tegminal strut short, penis guide with blunt apex (Fig. 5E), in lateral view regularly curved (Fig. 5F), in *N. cruentatus* tegminal strut long, penis guide pointed (Fig. 5I), in lateral view sinusoidal (Fig. 5J).

Novius cardinalis (Mulsant, 1850)

Material examined. El Greeting (29.I.2017), 3 exx. (leg. J. Krátký); Camino de Jinama (31.I.2017), 1 ex. (leg. J. Krátký); Valverde (30.I.2017), 1 ex. (leg. J. Krátký); Montaña del Gajo (30.I.2017), 1 ex. (leg. J. Krátký); Cueva de Don Juste (8.IV.2019), 1 ex. from succulents; El Sabinal (7.IV.2019), 1 ex. from *Juniperus* sp.; El Tomillar (7.IV.2019), 6 exx. from *F. carica*; Hoya del Morcillo (6.IV.2019), 1 ex. from *P. canariensis*; La Restinga (8.IV.2019), 2 exx. from *Hibiscus* sp.; Mirador de Isora (12.IV.2019), 4 exx. from *P. dulcis*; Tamaduste (12.IV.2019), 2 exx. from *P. lentiscus*; Tigaday (7.IV.2019), 8 exx. from herbaceous plants (leg. J. Romanowski and C. Zmuda).

Distribution. This species, native to Australia, is currently widely distributed in warmer regions throughout the world (Kovář 2007; Michaud 2012). Reported from all islands of the Canary archipelago (Oromí et al. 2010; Romanowski et al. 2019).

Remarks. This species has for a long time been placed in the genus *Rodolia* Mulsant, 1850. However, *Rodolia* was recently synonymized with *Novius* Mulsant, 1846 (Pang et al. 2020).

Sticholotidini Pope, 1962

Pharoscymnus decemplagiatus (Wollaston, 1857)

Fig. 3D

Material examined. Tamaduste (30.I.2017), 1 ex. (leg. J. Krátký); El Mocanal (9.IV.2019), 4 exx. from *Ficus* sp. and *Hibiscus* sp.; La Caleta (10.IV.2019), 11 exx. from *Euphorbia* sp., *Ficus* sp. and *Hibiscus* sp.; La Restinga (8.IV.2019), 1 ex. from *Hibiscus* sp.; Las Playas (12.IV.2019), 2 exx. from *N. oleander*; Montaña del Lajura (8.IV.2019), 5 exx. from *P. canariensis*; Sabinar

(8.IV.2019), 5 exx. from *Juniperus* sp.; Tamaduste (11.IV.2019), 8 exx. from *Yucca* sp.; Tigaday (8.IV.2019), 9 exx. from *Juniperus* sp. and *Ph. Canariensis* (leg. J. Romanowski and C. Zmuda).

Distribution. Species reported from all islands of the Canary archipelago (Oromí et al. 2010; Romanowski et al. 2019) and from Madeira (Wollaston 1857).

Remarks. One of the specimens of *P. decemplagiatus* collected in this study has a distinct color form depicted in Fig. 3D. It is entirely black, without yellow elytral spots found in typically colored specimens (for comparison see fig. 9B in Romanowski et al. 2019).

DISCUSSION

In this study we recorded the occurrence on El Hierro of 18 species of Coccinellidae, of which four have not previously been reported from the island (Table 2). On the other hand, we failed to find four species reported by other authors: *Scymnus* (*Mimopullus*) *marinus* Mulsant, 1850, *S. (Scymnus)* *rufipennis* Wollaston, 1864, *Stethorus wollastoni* Kapur, 1948 and *Novius cruentatus* (Mulsant, 1846). The total number of ladybird species so far documented to inhabit El Hierro is thus 22. However, the status of the species not recorded in this study (*S. marinus*, *S. rufipennis*, *S. wollastoni* and *N. cruentatus*) needs further investigation. Of the species newly reported for El Hierro, three (*Nephus incisus* *Novius canariensis* and *Coccinella miranda*) are the Canarian endemics, and the fourth (*Myrrha octodecimguttata*) is widely distributed in the Palaearctic region (Kovář 2007).

Although the number of ladybird species known from El Hierro increased slightly as a result of our survey, it is still the lowest among the main seven islands of the archipelago. Not much higher numbers were recorded on Lanzarote (Romanowski et al. 2020b) and La Gomera (Oromí et al. 2010) (23 species on each island), as well as on La Palma (Oromí et al. 2010) (25 species), while clearly higher on Gran Canaria (Romanowski et al. 2020a) (42 species) and Tenerife (Eizaguirre 2007; Oromí et al. 2010; Suarez et al. 2018) (41 species). The low ladybird species richness on El Hierro may be related to the island's small size, low age and long distance from the African continent. On the other hand, relatively few alien species have so far been recorded on El Hierro. Those include three widely distributed Australian species: *Cryptolaemus montrouzieri*, *Rhyzobius lophanthae* and *Novius cardinalis*. In contrast, on Lanzarote, apart from these three Australian species, the American *Delphastus catalinae* (Horn, 1895) and *Olla v-nigrum* (Mulsant, 1866) as well as the Asiatic *Pharoscymnus flexibilis* (Mulsant, 1853) have been found (Romanowski et al. 2020b). The latter two species probably arrived to

Table 2. The list of Coccinellidae recorded on El Hierro in this study and reported in previous papers. Question mark after a reference number means that the presence of a given species on El Hierro was questioned by the author(s) of the quoted paper. Species new to El Hierro in bold print.

No.	Species	This study	Literature data
1	<i>Chilocorus canariensis</i> Crotch, 1874	+	1, 2, 6, 7, 8, 10, 11, 12
2	<i>Parexochomus nigripennis</i> (Erichson, 1843)	+	1, 2, 6, 7, 8, 9 ¹
3	<i>Cryptolaemus montrouzieri</i> Mulsant, 1853	+	1, 7, 8
4	<i>Nephus flavopictus</i> (Wollaston, 1854)	+	2 ² , 3, 4, 6, 8
5	<i>Nephus incisus</i> (Lindberg, 1950)	+	–
6	<i>Rhyzobius litura</i> (Fabricius, 1787)	+	2, 6, 7?, 8, 11, 12
7	<i>Rhyzobius lophanthae</i> (Blaisdell, 1892)	+	2, 6, 7, 8
8	<i>Scymnus (Pullus) canariensis</i> Wollaston, 1864	+	1, 2, 6, 7, 8, 10, 11, 12
9	<i>Scymnus (Mimopullus) cercyonides</i> Wollaston, 1864	+	1, 2, 3, 6, 7, 8, 12
10	<i>Scymnus (Mimopullus) marinus</i> Mulsant, 1850	–	1, 2 ³ , 3, 6, 7, 8
11	<i>Scymnus (Scymnus) rufipennis</i> Wollaston 1864	–	1, 4, 6, 7, 8
12	<i>Scymnus (Scymnus) nubilus</i> Mulsant, 1850	+	1, 2 ⁴ , 6 ⁴ , 7, 8
13	<i>Stethorus tenerifensis</i> Fürsch, 1987	+	1, 3, 6, 7, 8
14	<i>Stethorus wollastoni</i> Kapur, 1948	–	1, 6, 7, 8, 11 ⁵ , 12 ⁵
15	<i>Coccinella miranda</i> Wollaston 1864	+	–
16	<i>Coccinella septempunctata algerica</i> Kovář, 1977	+	2, 5, 6, 7?, 8, 9, 11, 12
17	<i>Myrrha octodecimguttata</i> (Linnaeus, 1758)	+	–
18	<i>Hippodamia variegata</i> (Goeze, 1777)	+	1, 7, 8
19	<i>Novius canariensis</i> Korschefsky, 1935	+	–
20	<i>Novius cruentatus</i> (Mulsant, 1846)	–	1, 2, 6?, 7, 8
21	<i>Rodolia cardinalis</i> (Mulsant, 1850)	+	4, 6, 7?, 8
22	<i>Pharoscymnus decemplagiatus</i> (Wollaston, 1857)	+	1, 4, 6, 7, 8

¹ reported as *Exhochomus* (sic!) *flavipes*

² reported as *Nephus fractus* Wollaston

³ reported as *Pullus pallidivestis* Muls.

⁴ reported as *Scymnus levaillandi* (sic!) Muls. (2) and *S. levaillanti* Mulsant, 1850 (6)

⁵ reported by Wollaston as *Scymnus minimus* (Rossi), a synonymic name of *Stethorus pusillus* (Herbst, 1797). Later Kapur (1948) included the specimens collected by Wollaston in a newly described *S. wollastoni*.

References: 1 – Eizaguirre (2007), 2 – Franz (1995), 3 – Fürsch (1987), 4 – Israelson et al. (1982), 5 – Kovář (1977), 6 – Machado & Oromi (2000), 7 – Nicolas (2010), 8 – Oromi et al. (2010), 9 – Torres del Castillo et al. (1992), 10 – Uyttenboogaart (1935), 11 – Wollaston (1864), 12 – Wollaston (1865)

the Canary Islands very recently: *O. v-nigrum* was first time recorded in the archipelago in 2014 (Tenerife and La Palma) (as *Harmonia axyridis* (Pallas, 1773), see Romanowski et al. 2020a) and *P. flexibilis* in 2016 (Fuerteventura) (Romanowski et al. 2018). It can be assumed that in the near future these newcomers will also reach the western islands of the Canary archipelago, including El Hierro.

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