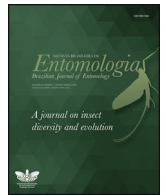




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Systematics, Morphology and Biogeography

*Psyllobora picta* (Germain) species complex (Coleoptera: Coccinellidae), with descriptions of two new species from Chile



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ABSTRACT

The *Psyllobora picta* species complex (Coleoptera: Coccinellidae: Coccinellini) was revised, with the description of two new species, *Psyllobora lueri* **sp. nov.** and *Psyllobora pauline* **sp. nov.**, both from Chile. *Psyllobora bicongregata* was recorded for the first time from Brazil, and there is no confirmed record of this species for Chile. Also, *P. picta* was not recognized from Paraguay and Uruguay. Male and female genitalia characters are illustrated for all the species.

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Introduction

Members of the genus *Psyllobora* Chevrolat are distinguished among the coccinellid beetles by their light colors, white, yellow or brown and with dark spots, ranging from light brown to black. The characteristic multidentate mandibles are associated with the micophagous habit, shared with a small number of genera previously grouped in the tribe Halyziini. The genus has a worldwide distribution, although most of the species are Neotropical.

Most of the South American species were described in the nineteenth and the first half of the twentieth centuries, with an additional 17 species described since then, totaling 55 species (Blackwelder, 1945; Mader, 1957; Almeida and Marinoni, 1983; Almeida, 1985, 1991a, 1991b, 1991c, 1992).

Except for the species described or revised in recent studies, which covered less than half of the known taxa, the genital apparatus of males has not been studied. Traditionally, elytral spots have been used for species identification, although this character is not always stable or accurate.

*Psyllobora picta* (Germain) has been cited from several countries of South America and linked to other species of the genus distributed in the same areas. The history of species related to *P. picta* began with its description by Germain in 1854. Soon thereafter,

Boheman (1859) described *Psyllobora bicongregata* Boheman from Argentina. Mulsant (1866), based on Chilean specimens, described *Psyllobora feralis*, which Philippi (1887) incorporated into his catalog of beetles in Chile as *Halycia femoralis* (sic). Crotch (1874) recognized *P. bicongregata* from Argentina and *P. feralis* from Chile and did not mention *P. picta*. Weise (1904) recognized the presence of *P. feralis* and *P. bicongregata* for Argentina and described *Psyllobora pavidata* Weise from that country. Brèthes (1923) synonymized the Chilean species under the name *P. picta* (= *P. feralis* = *P. femoralis*). Korschefsky (1932) synonymized *P. bicongregata* with *P. picta* as well, a decision followed by Costa Lima (1937) and Blackwelder (1945).

Finally, Mader (1957) revising specimens from both countries recognized them as the two different species *P. picta* (= *P. feralis*, = *P. femoralis*) and *P. bicongregata* (= *P. pavidata*), establishing *P. picta* in Chile, while considering *P. bicongregata* as also found in Argentina and Uruguay, but with doubtful records from Chile. However, Gordon (1987), who reviewed the Crotch collection, again considered *P. bicongregata* as synonymous with *P. picta*, based on Korschefsky (1932), and probably did not consider the work of Mader (1957). González (2008, 2010, 2013, 2014) and Serra et al. (2013) considered these two species as present in Chile, Argentina, Paraguay and Uruguay, based on the literature.

These species share similar characteristics in the pattern of spots and in the genital parts, and are referred to herein as a species complex of *P. picta*. González (2006) conducted analyses and dissections of specimens from several collections of this

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group. This information, together with observations in the current study of the genital parts, geographical distribution and morphological aspects, have made it possible to recognize the described species, as well as to establish their geographical distribution and to describe new species of this complex with some confidence.

## Material and methods

The terminology for adult structures, especially for the genitalia, corresponds to that used by Ślipiński (2007). The genital parts of all species included in this study were preserved in glycerin in microvials along with the respective specimen. The method of immersing the entire abdomen in a solution of 10% KOH, heated by thermal convection in a test tube immersed in boiling water was used. The abdomen was then washed in distilled water and the genital structure was separated under a stereomicroscope with the help of pins. All specimens and parts were photographed.

The length of the penis guide is measured from the apex to the insertion of the terminal strut, and the maximum length of the penis is measured from the apex to the farthest point of the penis tube.

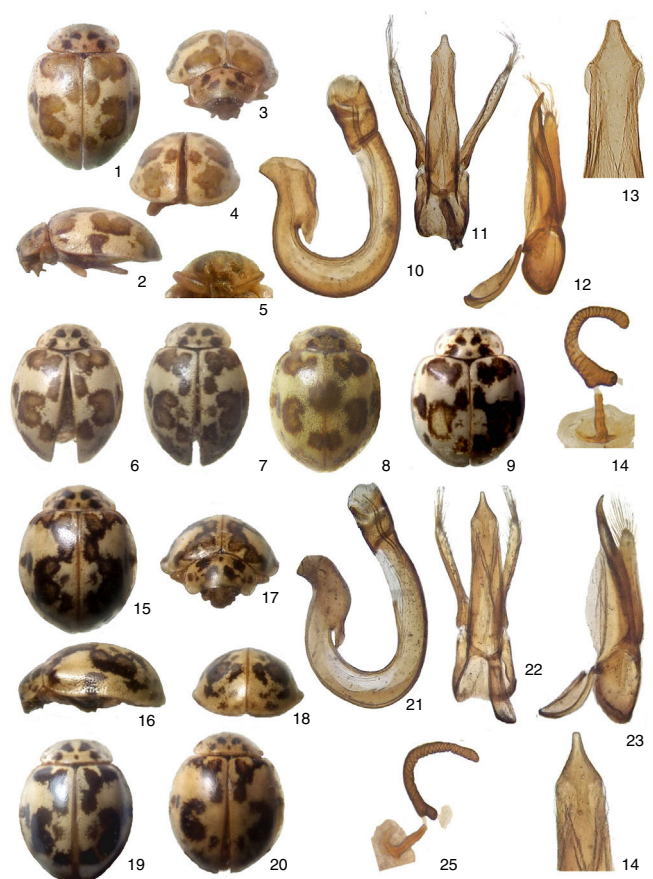
The material studied belongs to the following collections: CFDH: Federico d'Hervé private collection, Rio Negro, Argentina; CPAA: Alfonso Aguilera, private collection, Temuco, Chile; CPAL: Alfredo Lüer, private collection, Santiago, Chile; CPCF: Claudia Funes, private collection, Catamarca, Argentina; CPCR: Francisco Ramírez, private collection, Santiago, Chile; CPGG: Guillermo González, private collection, Santiago, Chile; CPMD: Manuel Diéguez, private collection, Santiago, Chile; CPRH: Richard Honour, private collection, Santiago, Chile; CPSL: Silvio Lanati, private collection, Mendoza, Argentina; CPUD: Ulf Drechsel, private collection, Asunción, Paraguay; DZUP: Coleção Entomológica Pe. J. S. Moure, Departamento de Zoologia, Universidade Federal do Paraná, Curitiba, Brazil (Lúcia M. Almeida); JEBC: Juan Enrique Barriga, private collection, Curicó, Chile; MAPA: Museu Anchieta de Ciências Naturais, Porto Alegre, RS, Brazil (Fernando R. Meyer); MHNP: Museo Nacional de Historia Natural de Paraguay, Asunción (John Kochalka); MHNS: Museo Nacional de Historia Natural de Santiago, Chile (Mario Elgueta); MNRJ: Museu Nacional do Rio de Janeiro, Brazil (Miguel A. Monné); UMCE: Colección Entomológica. Departamento de Biología. Universidad Metropolitana de Ciencias de la Educación (Danilo Cepeda); UNAB: Museo Entomológico Facultad de Agronomía, Universidad Nacional de Colombia, Sede Bogotá, Bogotá, Cundinamarca, Colombia (Francisco Serna).

The labels of the type materials are arranged in sequence from top to bottom, where the data for each label are within double quotes (""), a slash (/) separates the rows, and information between brackets ([]) provides the source and deposit collection.

## Results

### *Species complex associated with *Psyllobora picta* (Germain)*

Species associated with *P. picta* are characterized by their size (1.6–3.1 mm), pronotal plate with four spots in a semicircle around a fifth small spot near the middle of the base, sometimes one or two spots on each side, all independent or fused together. The elytral pattern consists of approximately ten spots (3:1:2:1:2:1), always recognizable but sometimes partially fused, separate or absent, or small supernumerary spots are present (Figs. 1, 19, 26, 40).

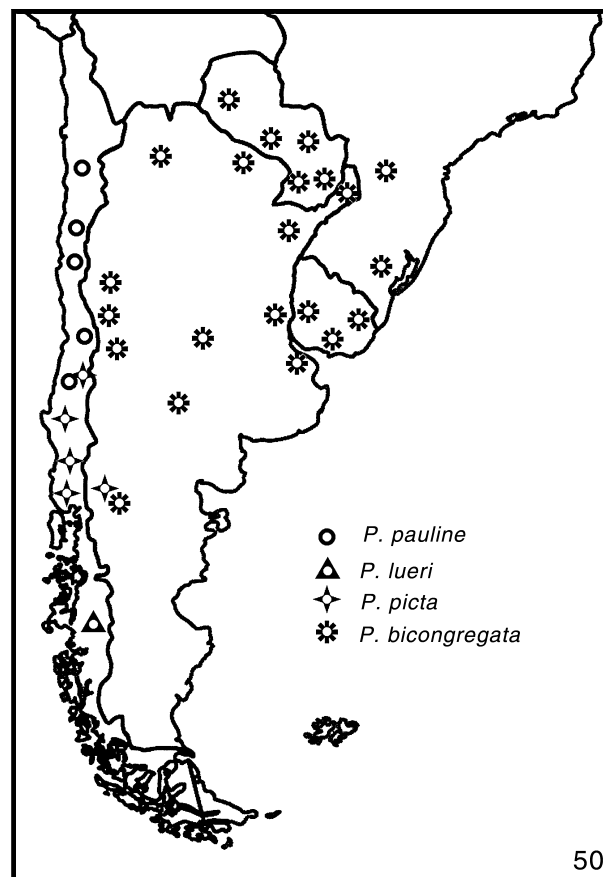
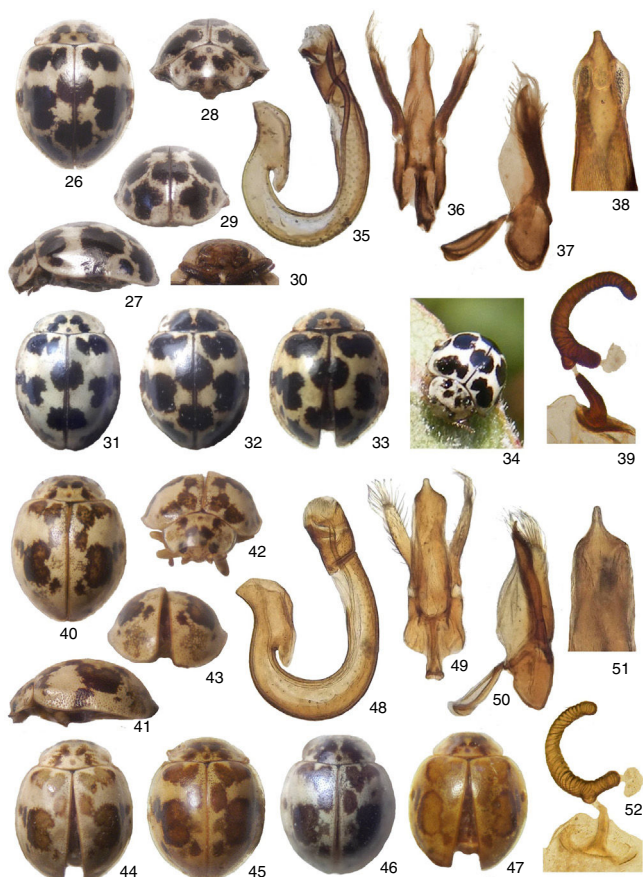


**Figs. 1–25.** 1–14: *Psyllobora pauline* sp. nov.: 1–5: male holotype habitus (dorsal, lateral, frontal, posterior and ventral detail); 6–9: variations (dorsal view); 10: male siphus; 11–13: male tegmen (dorsal, lateral and basal lobe detail); 14: female genitalia (spermatheca and infundibulum). 15–25: *Psyllobora lueri* n. sp.: 15–18: male holotype habitus (dorsal, lateral, frontal and posterior); 19–20: variations (dorsal view); 21: male penis; 22–24: male tegmen (dorsal, lateral and basal lobe detail). 25: female genitalia (spermatheca and infundibulum).

The clover-shaped apical spot has three subquadrate points (Figs. 4, 29).

The most distinctive character of the group is the very thick tube of the male penis, its width 1/6 of the maximum length, with the penis capsule with a convex outer corner and the apex about as thick as the tube, with a characteristic sub-rhomboidal shape, through which appears the sinuous ejaculatory duct, and an oblique sclerotic thorn on the apex. The structure of this penis is nearly the same in the different species of the complex (Figs. 10, 21, 35, 48). The tegmen in dorsal view has the sides of the penis guide straight or sinuate, slightly convergent, sometimes with a triangular mamilliform tip, characteristic in each species (Figs. 11, 22, 36, 49). In lateral view, there are membranous ventral penis guide projections, folded and crossing inward, more or less wide (Figs. 12, 23, 37, 50). Two subapical semicircular membranous and globose projections, shaped as faceted eyes, are present but are difficult to examine because they are usually crushed and deformed (Fig. 38). The spermatheca of the female is "C" shaped (Figs. 14, 25, 39, 52).

The color pattern of these species is very similar, which explains why they were synonymized. The characteristics of the penis, which has a width of 1/6 of the maximum length (not more than 1/8 in all other *Psyllobora* species) and the truncated apex of the same thickness as the tube are unique within the genus, and distinguish this complex from all other known species of *Psyllobora*.



**Figs. 26–52.** 26–39: *Psyllobora picta* (Germain): 26–30: habitus (dorsal, lateral, frontal, posterior and ventral detail); 31–33: variations (dorsal view); 34: specimen alive; 35: male penis; 36–38: male tegmen (dorsal, lateral and basal lobe detail); 39: female genitalia (spermatheca and infundibulum). 40–52: *Psyllobora bicongregata* Boheman: 40–43: habitus (dorsal, lateral, frontal and posterior); 44–47: variations (dorsal view); 48: male penis; 49–51: male tegmen (dorsal, lateral and basal lobe detail). 52: female genitalia (spermatheca and infundibulum).

**Fig. 53.** Distribution map of *Psyllobora picta* species complex.

**Key to species complex associated with *Psyllobora picta***

1. Penis guide wide, 3.5 times longer than wide, lateral margins converging to triangular apex with strongly concave sides forming distinct mamilliform projection (Figs. 49, 51). Dorsal color light brown, with brown spots with dark edges, annular, rarely with homogeneous color. Apical spots usually missing or disaggregated into small irregular spots (Figs. 40–47). Argentina, Brazil, Paraguay and Uruguay (Fig. 53)..... *Psyllobora bicongregata* Boheman
- Penis guide elongated, more than 4.0 times longer than wide, sides straight and converging or sinuate, apex triangular with slightly concave sides, with little-differentiated terminal projection. Dorsal color white to light brown, with black, dark-brown or light-brown spots with or without dark edges. Apical spots separated or not. Argentina and Chile..... 2
2. Penis guide nearly straight with slightly converging lateral margins (Figs. 22, 24). Dorsal color light brown, with brown spots with dark edges, annular, sometimes homogeneous, brown to dark brown. Elytral spots 2–1–4–5–6–7 almost always linked together, forming “S” shape. Apical spot almost always present, rarely missing or disaggregated into small irregular spots (Figs. 15–20). Chile (Chile Chico Province) (Fig. 53)..... *Psyllobora lueri* sp. nov.
- Penis guide sinuate, sides with evident narrowing at 2/3 of length. Dorsal color white to light brown, with black, dark-brown or light-brown spots with or without dark edges. Elytral spots rarely jointed, especially first and fourth spots always separate, never “S”-shaped. Southern Argentina and Chile (from Copiapó to Llanquihue provinces) 3
3. Penis guide with very wide pigmented ventral projections, twice as wide as paramere and semicircular border (Fig. 37). Dorsal color white with black spots, rarely yellowish or with dark-brown spots. Pronotal spots sometimes fused together. Spot 8 of both elytra fused in a common spot, sometimes spot 4 also fused with its counterpart (Figs. 26–35). Legs often with brown or black areas. Meso- and metaventrite generally black (Fig. 30). Southern Argentina and Chile (San Antonio to Llanquihue provinces) (Fig. 53)..... *Psyllobora picta* Boheman
- Penis guide with unpigmented ventral projections of irregular or straight edge, rarely semicircular, narrow, at most 1½ times width of paramera (Fig. 12). Dorsal color yellowish brown, with light-brown spots with dark border, ringed. Pronotal always with separate spots. Sutural spots 4 and 8 separate from suture, rarely together in suture and never forming a common spot with counterpart (Figs. 1–9). Legs yellowish brown. Meso- and metaventrite brown (Fig. 5). Chile (from Copiapó to Talca provinces) (Fig. 53)..... *Psyllobora pauline* sp. nov.

***Psyllobora pauline* sp. nov.**

(Figs. 1–14, 53)

**Holotype** ♂: “CHILE, Prov. [Provincia] Elqui/Tongoy/1-15-octubre-1996/leg. G. González” “♂ 576” (mv) [MHNS].

**Paratypes** (9 ♂ and 10 ♀; 2 ♀: same data of holotype [MHNS]. 2 ♂: “El Melocotón/Cajón del Maipo/Stgo Chile/enero 1977/G.

González F.” “♂♂ 567” (mv) [CPGG]. 2 ♂ and 1 ♀: “Fray Jorge/Prov. Limarí/Chile/16-II-1992, leg./G. González F.” “♂♀ 1645” (mv) [CPMD]. 1 ♂ and 1 ♀: “Chile, Elqui prov, Que-/brada El Arrayán, 10 km/S. La Villa, Malaise trap,/400m, 16-dic-2003 3-ene/2004, leg. ME Irvin, 30°/04'26" S, 71°00'4" W” “♂1647” “♀1647” (mv) [JEB]. 2 ♀ and 1 ♂: “Cuesta Pa-/jonales/Coquimbo/Chile/Oct. 6. 1974/coll:/H.

Vázquez” “Chile” “*Psyllobora/bicongregata*/Bohem. 1859./L.M. de Almeida det. 1990” “♂1655” “♀1655” (mv) [CPAA]. 1 ♂: “Chile, IV-R/Limarí/Las Rojas/26-IX-2006/leg. A. Lüer” (mv) [CPAL]. 1 ♂: “Chile, III R/Huasco/Vallenar/12-X-2008/leg. A. Lüer” (mv) [CPAL]: 1 ♂ and 2 ♀: “16-IX-2006 Hacienda/Los Andes – Hurtado/RM en algarrobo/Chile, Coll: R. Honour S.” “Macho/146”, “Hembra/142” and “Hembra/190” [CPRH]; 1 ♂: “11-II-2008/La Serena/IV Región/Chile, Coll: R. Honour S.” “Hembra/142” and “Macho/146” [CPRH]; 1 ♂: “16 a 19-IX-2006/Hacienda Los Andes/Hurtado - IV Región/En *Prosopis chilensis*/Chile, Coll: R. Honour S.” “Macho/191” [CPRH].

**Additional material** (44 specimens): **Chile**: *Copiapó*: Bahía Inglesa, 1-XI-1994, leg. J. E. Barriga, 1 specimen [JEB]. *Cordillera*: El Melocotón, I-1977, G. González F. 3 specimens [CPGG]. *Elqui*: Paihuano, 23-VIII-1994, leg. G. González, 1 specimen [CPGG], Camino Tongoy-Tambillo, 6-XII-1985, G. González F. 9 specimens [CPGG], Quebrada El Arrayán, 10 km. S. La Villa, 400m, 16-XII-2004 a 3-I-2004, leg. ME Irwin, 5 specimens [JEB], Rivadavia, 24 a 26-XII-1946, coll. L.E. Peña, 1 specimen [CPRH], Tongoy, 1 a 15-X-1966, leg. G. González, 8 specimens [CPGG], Vicuña, 3-VII-1975, coll. E. Loo, en zapallo, 1 specimen [JEB]. *Limarí*: Fray Jorge, Quebrada Honda, 7 a 24-XI-2003, leg ME Irwin and F. Parker, 2 specimens [JEB], Fray Jorge PN, El Mineral, 224m, 12 a 31-XII-2003, leg ME Irwin and F. Parker, 2 specimens [JEB]; La Serena, 11-feb-2008, coll: R. Honour S, 1 specimen [CPRH]; La Serena, Reserva Santa Gracia, feb-2018, coll: R. Honour, 1 specimen [CPRH], *Limarí*: Hurtado, Hacienda Los Andes, 16 a 19/IX/2006, coll: R. Honour, en *Prosopis chilensis*, 1 specimen [CPRH]; same data except “en algarrobo” “macho”, 3 specimens [CPRH]; Camino Vicuña – Hurtado km 14, 16 a 23/IX/2006, coll: R. Honour, 1 specimen [CPRH]; *Maipo*: Rangué, 6-4-1996, Coll: A. Lüer, 1 specimen [CPAL]; *Quillota*: Granizo, 17-XI-1990, leg. G. González, 1 specimen [CPGG]. *Santiago*: II-1964, G. González F. 1 specimen [CPGG], Quebrada de Macul. *Talca*: San Javier, Porter, 1 specimen [MHNS].

### Diagnosis

The dorsal color yellowish brown with ten light brown spots with dark border, ringed, and the very thick tube of the male penis (its width 1/6 of the maximum length), separate *P. pauline* from the majority of the genera species. From the similar looking *P. lueri* is distinguished by the penis guide with sinuate sides with evident narrowing at 2/3 of length and the elytral spots rarely jointed, while from the other similar looking species *P. bicongregata* is distinguished by the penis guide elongate more than 4.0 times longer than wide. Otherwise, *P. lueri* is restricted to Chile Chico province from Chile, and *P. bicongregata* to Argentina, Brasil, Paraguay and Uruguay, regions where *P. pauline* is not present.

### Holotype description

**Male**. Length 4.0 mm; width 3.4 mm. Body oval, with maximum width near middle of elytra; yellowish brown, with 5 dark-brown spots on pronotum, elytra with 10 dark-brown irregular spots, with dark borders. Legs, antennae and mouthparts yellowish brown. Ventral surface slightly brownish, metaventrite dark brown. Dorsal punctation fine and sparse, opaque (Figs. 1–5).

**Head**: Light brown, except 2 dark-brown spots on frons. Antennae, labrum, maxillary palps and labium brown. Eyes rounded, head three times width of eye. Punctation irregular, denser laterally, where points are separated by 2 or more diameters (Fig. 3).

**Thorax**: Pronotum light brown, with lateral and anterior borders translucent yellow. Small brown spot near base, with semicircle of four brown spots around center spot, two posterior spots touching base and two anterior spots at mid length, all equidistant from each other. Scutellum small, triangular, dark brown (Figs. 1, 3). Hypomeron and mesoventrite yellowish brown, metaventrite dark

brown. Legs yellowish brown (Fig. 5). Pronotum with very sparse, almost imperceptible punctation.

**Elytra**: Light yellowish brown, with ten brown spots, with partly darkened borders, especially those spots closest to lateral border. Spots 1 and 2 large, about 1/6 length of elytra, adjacent to base and joined together at middle; spot 3 almost punctiform, near humeral angle; spot 4, 1/5 to 2/5 length; spots 5 and 6 similar in size to spots 1 and 2, spot 5 discal and spot 6 lateral, attached to margin, darker than remaining spots; spot 7 immediately behind 5, connected at outer border, forming single large “C” shaped spot, open to suture; spot 8 near suture, half size of spot 4; spot 9 smaller, near lateral border, darker, similar to spot 6; spot 10 behind 7, large and cloverleaf in shape. Punctation small, irregularly distributed, separated by about four diameters on average. Epipleuron pale yellow, strongly descendant (Figs. 1–4).

**Abdomen**: Light brown with first two ventrites brown in middle; ventrites 3–5 yellowish in middle. Postcoxal lines diagonal, descending 45°, bent posterior border attached to it. Ventrite 3 slightly truncate, ventrite 6 half length of 5, rounded and weakly notched in center.

**Male genitalia**: Tegmen 4.5 times longer than wide, subrectangular phallobase 1.2 times longer than wide and with slightly rounded posterior margin. Terminal strut short, less than half length of tegmen. Penis guide parallel at basal 2/5, narrowing in width from 7/10 to 3/5 long, apex triangular with concave sides in apical 1/9; in lateral view subtriangular, sinuous, distal 1/3 bending toward parameres, membranous projections narrow and with irregular borders. Parameres in dorsal view narrow, curving slightly to phallobase, 1/8 shorter than basal lobe, at distal 2/3 with long pubescence, longer than paramere, in lateral view wider in distal third (Figs. 11–13). Penis maximum width approximately 1/5 of maximum length, basal half semicircular, curved to 2/3 of length, distal 1/3 straight. Apex 1/6 of length and slightly wider than penis tube, separated from it by sclerotized connection in widely obtuse angle, with ejaculatory duct “S” shaped and sclerotized spine near apex; penis capsule with internal branch acute, outer branch twice as wide as the internal branch, basal margin convex with slight notch in center (Fig. 10).

**Female**: Similar to male. Spermatheca “C” shaped, about eight times longer than wide, cornu short, slightly expanded at apex, with lateral nodulus and ramus 1/6 of total length, very short seminal duct, anchor-shaped infundibulum half size of spermathecal (fig. 14). Coxites paddle-shaped, with very wide pubescent apex and distinct stylus.

**Variation**: Length 1.6–2.5 mm. The background color varies from light yellow to light brown. The spots are brown with dark borders giving the appearance of rings, or without borders. Rarely, specimens have homogeneous dark-brown spots. The size of the spots varies slightly; sometimes the head spots can occupy the entire area between eyes. The pronotal spots are always separate, although sometimes the central spot may be missing; while elytral spots can sometimes be in contact with each other, but without fusing, and the posterior spots are sometimes missing. Sometimes there are some small supernumerary spots in different areas of the pronotum and elytra. Some specimens have a thin dark border at the base of the elytra, along suture or along elytral margins (Figs. 1, 6–9).

### Discussion

*Psyllobora pauline* sp. nov., from Chile, can be confused with *P. bicongregata* from Argentina and other countries, due to its very similar color pattern, although the male genitalia are very different (see species key). Only *P. picta* shares its distribution with *P. pauline* sp. nov. In addition to the differences in the genitalia and habitus, indicated in the key, both species have been frequently observed in

nature in areas where their distributions overlap, usually in groups of 5–30 specimens on each plant, but never individuals of the two species on the same plant.

#### Remarks

*Psyllobora pauline* sp. nov. and *P. picta* have very similar male genitalia, making some specimens difficult to distinguish based on this character, but the overall appearance is very different. This situation is not unusual in species of Coccinellidae and reinforces the combined use of characters. A remarkable example is *Adalia angulifera* Mulsant and *Adalia deficiens* Mulsant, both from Chile and Argentina, which have indistinguishable male genitalia but are very different in their habitus. In contrast to the present case of *Psyllobora* species, both species of *Adalia* are frequently found in abundance on the same plant, often in copulation, but always between the same species, and are therefore sympatric species.

**Geographical distribution:** Chile, Copiapó to Talca provinces (Fig. 53).

**Etymology:** This species is named in memory of Pauline América Aguilera Phillips (1970–2015), daughter of Alfonso Aguilera Puente, agronomist engineer and specialist in the study of ladybirds of Chile, author of numerous works on the group, friend and collaborator in developing the website “Coccinellidae de Chile”. The name is proposed as a noun in apposition.

#### *Psyllobora lueri* sp. nov.

(Figs. 15–25, 53)

**Holotype** ♂: “Chile, XI-R [Región]/Gral. [General] Carrera/Chile Chico/14-2-2005/coll. [leg.] A. Lüer” “♂ 1657” (mv) [MHNS].

**Paratypes** (20 specimens): 1 ♂: same data as holotype except “♂ 148” (mv) [CPAL]. 1 ♂ and 2 ♀: same data except date 16-2-2005 (mv) [MHNS]. 12 specimens: same data except several dates from 12 to 17-2-2005 [CPAL]. 2 ♂: “10/02/2016/13 km W Chile Chico/XI Región/Chile leg. R. Honour S.” “♂♂ 1733” (mv) [CPRH] and 2 ♀: same data except “♀♀ 1733” (ab) [CPMD].

#### Diagnosis

The dorsal color yellowish brown with ten light-brown spots with dark border, ringed, and the very thick tube of the male penis (its width 1/6 of the maximum length), separate *P. lueri* from the big majority of the genera species. From the similar looking *P. pauline* is distinguished by the penis guide nearly straight with slightly converging sides and the elytral spots 2–1–4–5–6–7 almost always linked together, forming an “S” shape, while from the other similar looking species *P. bicongregata* is distinguished by the penis guide elongate more than 4.0 times longer than wide. Otherwise *P. pauline* is restricted to Copiapó to Llanquihue provinces from Chile, and *P. bicongregata* to Argentina, Brasil, Paraguay and Uruguay, regions where *P. lueri* is not present.

**Holotype description:** Male. Length: 2.4 mm, width: 1.9 mm. Oval with maximum width near middle of elytra. Back yellowish brown, with five dark-brown spots on pronotum and two small supernumerary spots near border, elytra with ten brown spots with darker, irregular borders, with spot ten widely scattered and a clearer supernumerary spot between spots 5 and 7. Spots 3–2–1–4–5–7–8 joined together, forming an “S” pattern. Legs, antennae and mouthparts yellowish brown. Ventral surface light brown with dark-brown metaventrite. Dorsal punctation inconspicuous, irregular, surface opaque, without reticulation (Figs. 15–20).

**Head:** Color light brown, with two brown spots between eyes at insertion of antennae and large dark-brown transverse spot above eyes, extending laterally on vertex. Antennae, labrum, maxillary

palps and labium light brown. Eyes rounded from three times width of eye. Punctuation irregular, denser laterally, with points separated by two or more diameters.

**Thorax:** Pronotum light brown, with anterior and lateral borders yellowish and translucent. Small central brown spot near base, surrounded with semicircle of four brown spots, two posterior spots touching base and two anterior spots half length of pronotum, all equidistant from each other, and two small, pale, somewhat irregular spots on each side. Scutellum small, triangular, dark brown (Figs. 15, 17). Hypomeres and mesosternum yellowish brown, metaventrite dark brown. Legs yellowish brown. Pronotum with almost imperceptible punctuation, points widely separated.

**Elytra:** Slightly yellowish brown, with ten brown spots, with somewhat darker borders (3:1:2:1:2:1) and clearer supernumerary spot in space between spots 5, 7 and suture. Spot 1 very large, almost ¼ length of elytra, spot 2 slightly smaller and spot 3 even smaller, adjacent and in contact with base, connected together at middle; spot 4 longitudinal-oval, occupying 1/5 to 2/5 of length of the elytra, close to suture but not touching, near spots 1 and 5; spots 5 and 6 nearly half length of the elytra, spot 5 large and connected to spots 4 and 7, and spot 6 separate and half divided longitudinally, homogeneous dark brown; spot 7 immediately behind large spot 5, semicircular, connected at outer border, both forming large “C” shaped spot, in space between these and suture, with supernumerary spot much clearer, small and irregular; spot 8 near suture, half of diameter of spot 4, spot 9 on same transverse line but still smaller, near lateral border, dark brown; spot 10 disjointed in three small irregular inconspicuous spots, arranged in triangle (Figs. 15–18). Punctuation with large distinct points, irregularly distributed, separated by about two diameters on average. Pale yellow epipleuron strongly descendant, with small dark spot in middle of outer border.

**Abdomen:** Brown, with middle of first two ventrites dark brown. Postcoxal lines descending diagonally at 45°, bent to touch back border attached to it. Ventrite V emarginate around posterior margin, ventrite VI as short as half of 5 ventrite, gently rounded with shallow notch in center.

**Male genitalia:** Tegmen 4.5 times longer than wide, phallobase subtrapezoidal, 1.1 times longer than wide and with posterior border slightly rounded. Terminal strut 1/3 length of phallobase. Penis guide in dorsal view with slightly converging sides, slightly sinuous, narrowing to 3/4 of width at 5/6 of length, apical 1/6 ending in triangle, with concave sides and slight apical projection; in lateral view triangular, sinuous, bent toward parameres in distal 1/6 of apex. Parameres in dorsal view narrow and slightly curved toward basal lobe, 1/5 shorter than this, with pubescence in distal half, exceeding paramere in almost half of length (Figs. 22–24). Penis width about 1/6 of maximum length, in a semicircle in basal half, slightly curved to 2/3 length, distal 1/3 straight. Apex 1/6 of length and slightly wider than penis tube, separated from it by a sclerosed union at widely oblique angle, with ejaculatory duct “S” shaped and sclerose spine on apex; penis capsule with internal branch hook-shaped, outer branch twice as wide as internal, basal margin convex (Fig. 21).

**Female:** Similar to male. Spermatheca “C” shaped, about ten times longer than wide, narrowing regularly toward apex, nodular lateral and short, ramus 1/10 of total length, seminal duct very short. Infundibulum “Y” shaped, half size of spermathecal (Fig. 25). Coxites paddle-shaped, with very wide, pubescent apex and evident stylus.

**Variation:** Length 2.1–2.6 mm. Color nearly homogenous, spots varying from light brown dark-ringed to homogeneous dark brown. The spots, especially on the pronotum and supernumerary of the elytra tend to disappear, while the elytral spots may be partially disjointed to rarely losing the “S” shape, the posterior spot sometimes complete (Figs. 15, 19, 20).

## Discussion

*Psyllobora lueri* sp. nov. differs in the coloration pattern and in the male genitalia (see species key). Also, it is geographically isolated from other species of the genus, probably occurring in Argentina to Chubut Province, where no *Psyllobora* species has been recorded previously.

**Geographical distribution:** Austral Chile, Chile Chico Province (Fig. 53).

**Etymology:** This species is named for Alfredo Lüer, dedicated Chilean entomologist and collector of many of the known specimens of this species.

### *Psyllobora picta* (Germain, 1854)

(Figs. 25–37, 50)

*Coccinella picta* Germain, 1854:335; Philippi, 1887:173.

*Psyllobora picta*: Brèthes, 1923:454; Costa Lima, 1937:32; Blackwelder, 1945:455; Mader, 1957:54; González, 2008:95, 2013:52, 2014:530; Serra et al., 2013:238.

*Psyllobora feralis* Mulsant, 1866:178, Crotch, 1874:142; Weise, 1904:195; Gordon, 1987:17 as synonym of *P. picta*).

*Psyllobora picta* a. *feralis*: Blackwelder, 1945:455.

*Halyzia femoralis*: Philippi, 1887:174 (transcription error “feralis”).

**Male genitalia:** Tegmen 4.3 times longer than wide on average, phallobase subrectangular, 1.1 times longer than wide and with somewhat rounded posterior border. Terminal strut 2/5 of phallobase length. In dorsal view, penis guide with almost parallel sides in basal half, then sinuous and reduced to 3/5 width in distal third, with membranous semicircular lateral expansions, apical 1/6 triangular with concave sides and slight apical projection; in lateral view with yellowish ventral projections, semicircular and with very wide border, twice width of paramere, in 1/3 distal apex curving toward parameres. Parameres narrow in dorsal view and slightly curved toward penis guide, 1/5 shorter than penis guide, distal half with long pubescence, which exceeds paramere by almost half its length (Figs. 36–38). Penis wide, about 1/6 of maximum length, basal half semicircular, slightly curved until 2/3 of length, distal 1/3 straight. Apex comprising 1/6 of length and slightly wider than penis tube, separated in strongly acute angle, with ejaculatory duct “S” shaped and sclerose spine at apex; penis capsule, internal branch hook-shaped, outer branch twice as wide as internal branch, basal margin sometimes slightly convex, with notched center (Fig. 35).

**Female:** Similar to male. Spermatheca “C” shaped, about eight times longer than wide, lateral nodulus quite short, ramus 1/6 of total length, seminal duct very short, infundibulum irregularly anchor-shaped, half size of spermatheca (Fig. 39). Coxites paddle-shaped, with very wide apex and evident hair stylus.

**Variation:** Length 2.2–3.1 mm. Dorsal color of live specimens bright white with black spots (Fig. 34), but some specimens with the dorsal color ivory yellow and dark-brown spots. Spots of the head are always present, sometimes joined. Pronotal spots on the same side are sometimes fused in oblique stripes, both stripes sometimes joined at the base; some specimens have additional spots on the pronotum border, together or separate. Elytral spots are variable, with spot 4 and sometimes spot 8 forming a common spot with its counterpart on the other elytra, or slightly separated and touching the suture, spots 1–3 normally attached, others sometimes slightly touching, and apical spot 10 is always well formed (Figs. 26, 31–34). Ventral surface of metaventre is usually black, and sometimes pro-, mesosterno-, and part of abdomen black. Femurs clear or in some specimens have black rings covering the middle area (Fig. 30).

**Distribution:** Southern Argentina (Neuquén and Río Negro provinces) and Chile (San Antonio to Llanquihue provinces) (Fig. 53). The report of this species presence in Paraguay (González,

2013) should be discarded, since it comes from a citation of Bertoni (1925) that probably referred to *P. bicongregata*, at that time considered a synonym of *P. picta*. For the same reason, it is likely not present in Uruguay, where it was cited by Ruffinelli and Carbonell (1954). The presence of the species in Argentina is based on a single citation of *P. feralis* Weise (1904) in Neuquén and one female from El Bolsón, Río Negro Province, so its presence should be confirmed by examination of male specimens.

**Type material examined:** Holotype: “Chile” “Holotipo” “*Coccinella picta* Germain” “M.N./H.N./Tipo N° 2162” [MHNS].

**Dissected Material examined** (11 ♂ and 12 ♀): 1 ♂ and 1 ♀: “Chile, Prov. San/Antonio, Algarrobo/16-enero-1989/leg. G. González” [CPGG]. 2 ♂ and 1 ♀: “[Chile] Maullín a/Las Quemadas/Llanquihue/17, -dic. 1972/Coll: L.E. Peña” [UMCE]. 2 ♂ and 1 ♀: “Chile, Prov. Melipilla/Pollocabe 300 msnm/7–29-marzo-2004/leg. V.M. Diéguez” “gen. 1648” [CPMD]. 1 ♀: “[Chile] Quillota/7 1894” “Colección/P. Germain” “*Psyllobora/picta*/(Germain)/Mader det.” “gen. 1649” [MHNS]. 1 ♂: same data except “gen. 1650” [MHNS]. 1 ♂ and 1 ♀: “Contulmo/Arauco/IX-Reg-Chile/10-I-1988” [CPGG]. 1 ♂ and 1 ♀: “[Chile] S. Isidro XII” “Colección Philippi” “Gen 1654” [MHNS]. 1 ♀: “Chile X-R/Valdivia/San José de la Mariquina/2-2-1985/Coll: C. Fierro” “Gen 1658” [CPAL]. 1 ♀: “Chile – R.M./Chacabuco/Chacabuco/15-II-2008/Coll: A. Lüer” “Gen 1659” [CPAL]. 1 ♂: same data except “12-XI-2007” [CPAL]. 1 ♀: “Argentina, Río Negro/El Bolsón/41,939242°S 71,544006°W/Febrero 2002/Leg. P. Sackman” (ab) [MHNS]; 1 ♀: “marzo 2007/P.N. La Campana/V Región/Chile Coll: R. Honour S” “Hembra 187” [CPRH]; 2 ♀: “23-IV-1993/Cuesta Barriga/Padre Hurtado R.M./Chile Coll: R. Honour S” “Hembra 139” and “Hembra 145 [CPRH]; 2 ♂: same data except “macho 140” and “macho 144” [CPRH].

**Other material examined** (101 specimens): **Chile:** without data, coll. P. Germain, 2 specimens [MHNS]; *Bio-Bio:* Trapa-Trapa, 16-12-1996, coll. A. Lüer, 1 specimen [CPAL]; *Cachapoal:* Pencahue, 24-10-1991, coll. A. Lüer, 1 specimen [CPAL]; Ladera S. Cerro Llivilivi, 1-9-2012, leg. A. Lüer, 1 specimen [CPAL]; *Cautín:* Villarica, 12-II-1964, T. Cekalovic, 41 specimens [DZUP]; Temuco, III-1922, D.S. Bullock, 1 specimen [MNRJ]; Caburga, 16-2-2008, coll. A. Lüer, 2 specimens [CPAL]; Lican-Ray, I-1982, G. González F. 1 specimen [CPGG]; Curacautín, Lag. Conguillio, 6-I-1979, leg. D. Jackson, 1 specimen [CPGG]; *Chacabuco:* Chacabuco, El Roble, 6-III-2011, leg. A. Lüer, 1 specimen [CPAL]; *Choapa:* Limahuida, 17-X-2009, leg. A. Lüer, 1 specimen [CPAL]; *Cordillera:* San José de Maipo, Lagunillas, 2100m, leg. R. Honour S, 1 specimen [CPRH]; *Curicó:* Cerro Hueca-Huecan, Zapallar, 15 km E Curicó, 12 a 21-XII-1997, Malaise trap, leg. J.E. Barriga, 1 specimen [JEB]; 15 km E. Potrero Grande, 29-I-1995, leg. J.E. Barriga, 1 specimen [JEB]; *Llanquihue:* Todos los Santos, Cayutue, 6-III-(19)50, coll. Kuschel, 2 specimens [MHNS]; Fresia, 6-I-(19)45, coll. Kuschel, *Ribes nigrum*, 1 specimen [MHNS]; *Malleco:* Conguillio, 3-II-1983, E. Krahnert, 1 specimen [MHNS]; El Manzanar, Lonquimay, IV-1988, leg. J.E. Barriga, 1 specimen [JEB]; Lonquimay, 12-I-2008, fogging s/Nothofagus dombeyi, leg. J.E. Barriga, 1 specimen [JEB]; Pemehue, Selva Oscura, 22-12-1996, coll. A. Lüer, 1 specimen [CPAL]; Victoria, Fdo. Las Mariposas, 18-10-1995, coll. A. Lüer, 2 specimens [CPAL]; *Melipilla:* Melipilla, C° Cantillana, 2-8-1998, leg. A. Lüer, 1 specimen [CPAL]; Chihuehue, 21-II-2007, leg. A. Lüer, 1 specimen [CPAL]; *Quillota:* 3-XI-1963, M. Cerda, 1 specimen [MNRJ]; *Ñuble:* San Fabián, 21-11-1994, Coll. A. Lüer, 1 specimen [CPAL]; Chillán, Las Comadres, 6-I-1996, coll. S. Roitman, 2 specimens [CPGG]; Los Lleuques, 12-12-2008, leg. A. Lüer, 1 specimen [CPAL]; Las Trancas, 11 a 16-II-2011, leg. R. Honour S, 1 specimen [CPRH]; *Petorca:* La Canela, 20-dic-2008, leg. A. Lüer, 1 specimen [CPAL]; *Quillota:* Quillota, 7-1894, Colección P. Germain, 1 specimen [MHNS]; P.N. La Campana, marzo 2007, Coll: R. Honour S. 1 specimen [CPRH]; *San Antonio:* Algarrobo. 16-II-1969, G. González F, 6 specimens [CPGG]; *Santiago:* Vallecito, 19-2-2011, leg. A. Lüer, 1 specimen [CPAL]; Quebrada Macul,

4–VIII, J-C. Sáez, 1 specimen [JIBC]; Renca, IV-1964, leg. L.E. Peña, 1 specimen [JIBC]; *Talagante*: Chiñihue, 20–8–2009, leg. A Lüer, 1 specimen [CPAL]; Maipú, 26–XI–2011, coll: R. Honour S, 4 specimens [CPRH]; *Talagante*: Padre Hurtado, Cuesta Barriga, Coll: R. Honour S. 2 specimens [CPRH]. *Talca*: Vilches Alto, 10–XII–1988, Trampa malaise, 1 specimen [CPGG]; Altos de Vilches, I-1997, leg. J.E. Barriga, 1 specimen [JIBC]; *Valdivia*: Puerto Piriñueico, 16–I–1998, leg. A Lüer, 1 specimen [CPAL]; *Valparaíso*: 4–X–1921, 417/FCC–567, 1 specimen [MNRJ]; Las Zorras (near Valparaíso), 25–II–1932, 3 specimens [MNRJ]; Limache, II–1922, 418/FCC–568, 1 specimen [DZUP]; Lo Vazquez, X–1988, leg. J.E. Barriga, 1 specimen [JIBC].

### Discussion

*Psyllobora picta* is easily recognizable by its white color with well-defined black spots (Fig. 34) (see species key). A few specimens are ivory- yellow or with dark-brown spots, somewhat similar to some specimens of *P. pauline* **sp.nov.**, but retain the other characteristics of the species. Probably the color of these specimens is the result of some post-mortem processes, because they come from old collections. The populations of southern Chile have larger and more pigmented specimens, but correspond well with the species (see note under *P. pauline* **sp.nov.**).

### *Psyllobora bicongregata* Boheman, 1858

(Figs. 40–53)

*Psyllobora bicongregata* Boheman, 1858:203, Crotch, 1874:141; Weise, 1926:11; Blackwelder, 1945: 455 as synonym of *P. picta*; Mader, 1957: 24; Gordon, 1987:17 as synonym of *P. picta* (González, 2008:95; 2013:52, 2014:530; Serra et al., 2013:237.

*Psyllobora pavid* Weise, 1904:195; Blackwelder, 1945: 455; Mader, 1957:24.

**Male genitalia:** Tegmen 3.6 times longer than wide on average, phallobase subrectangular, as long as wide and with rounded border. Terminal strut short, 1/3 of phallobase length. In dorsal view, penis guide with gently sinuous sides, with a sinuosity at 3/5 of length and almost parallel sides, reduced to 4/5 of basal width at 5/6 of length, then tapering sharply in triangle in apical 1/6 to end in mamilliform projection in apical 1/12; in lateral view with yellowish ventral semicircular projections very wide, twice width of paramere, in 1/3 distal apex curving to parameres. Parameres in dorsal view narrow and slightly curved, 1/6 shorter than basal lobe, distal half with long pubescence, which exceeds paramere by over half its length (Figs. 49–51). Penis wide, about 1/6 of maximum length, basal half semicircular, then gently curving to 2/3 length with straight distal 1/3. Apex occupying 1/6 of length and slightly wider than penis tube, separated from it by almost perpendicular union, with ejaculatory duct “S” shaped and sclerosed spine on inner apex; penis capsule, inner branch hook-shaped, outer branch twice as wide as internal, basal margin convex, sometimes somewhat emarginate to center (Fig. 48).

**Female:** Similar to male. Spermatheca “C” shaped, about eight times longer than wide, lateral nodulus quite short, ramus 1/6 of total length, seminal duct short, infundibulum irregularly anchor shaped, half size of spermathecal (Fig. 52). Coxites paddle-shaped, with very wide apex and evident stylus.

**Variation:** Length 1.9–2.7 mm. Dorsal color varies from light brown to yellowish ivory, spots brown with darkened borders, outer spots usually homogeneously dark brown, sometimes some of discal spots dark brown. Head spots varying in size and color. Pronotal spots varying in size, sometimes joined on same side, some specimens with small spots on border of pronotum. Elytral spots quite variable, always separate from suture, usually spots 1–3 and spots 5–7 joined, other spots sometimes lightly touching. Super-numerary spots usually between spots 5, 7 and suture, sometimes

very light in color, apical spot usually distinct, very light in color, sometimes blurry. Spot 6 often separated into two small longitudinal spots. Ventral surface light brown, usually with darker brown metaventrite (Figs. 40, 44–47). In one case, we observed only spots 1, 2 and 4 and an entirely clear ventral surface, perhaps an immature specimen.

**Geographical distribution:** Argentina (from Neuquén north), Uruguay, Paraguay and southern Brazil (Paraná) (Fig. 53).

**Dissected material examined** (12 ♂ and 13 ♀): 3 ♂ (mv) and 1 ♀ (ab): “Argentina, prov. Formosa/Estancia La/Marcela, 35 km E. El/Colorado/21 dic 2004,/26°17.35' S 59°8.6' W leg/J. Williams JE Barriga” [JIBC]. 2 ♂ (mv) and 3 ♀ (mv): “[Argentina] Trampa agua. Cult. Hinojo/Pocito, San Juan/23-IX-2005. Lanati S.J. col” [CPSL]. 1 ♂ (mv) and 1 ♀ (mv): “Argentina, Prov./Cordoba. Capilla del/Monte, 7-mar-2006, luz./Leg. D. Carpintero [JIBC]. 2 ♀ (mv): “Argentina, La Rioja/Villa Mazán, Finca/Dahba, 11-IX-2009/Leg. Claudia Funes” [CPCF]. 1 ♂ (mv) and 2 ♀ (ab): “Argentina, La Rioja/Villa Mazán, Finca de/La Fuente, 51-II-2009/Leg. Claudia Funes” [CPCF]. 1 ♂ (mv) and 2 ♀ (ab, mv), “Argentina, Rio Negro/Cervantes Chacra/Metallier, 5/V/2015, leg./F. d’Hervé, en perales/fajas de cartón” [CFDH]. 1 ♂ (mv): “Bariloche/Rio Negro/II-1976” “Colección/Dr. Carpintero/Argentina” “*Psyllobora bicongregata*/det. Dr. Carpintero” [JIBC]. 2 ♂ (mv) and 1 ♀ (mv), “Argentina, Rio Negro/Fray Luis Beltrán, Chacra/Castagno, 29/III/2014, leg./F. d’Hervé, en manzanos/fajas de cartón” [CFDH]. 1 ♂ (mv) and 1 ♀ (mv): Paraguay, Paraguari/Sapucay, Chircal./S25°43' W56°59'/38-31-I-2005/leg. Ulf Drechsel [CPUD].

**Other material examined** (222 specimens): **Argentina:** Buenos Aires: Buenos Aires, XII-(19)78, leg. J.E. Barriga, 1 specimen [JIBC]; Burzaco, I-(19)40, leg. H.C. Hepper, 1 specimen [JIBC]; Delta, X-1959, M.J. Viana, 11 specimens [JIBC]; La Plata, Villena, 05/10/2011, M. Lattari, 1 specimen [CPGG]; Miramar, II-2004, leg. D. Carpintero, 1 specimen [JIBC]; Palermo, XI-1976, leg. J.E. Barriga, 1 specimen [JIBC]; Pilar, 13-XI-1976, leg. J.E. Barriga, 1 specimen [JIBC]; Punta Lara, XI-1959, M.J. Viana, 5 specimens [JIBC]; Quilmes, I-2002, leg. D. Carpintero, luz, 1 specimen [JIBC]; Tandil, II-2001, leg. Dellais, luz, 1 specimen [JIBC]; Tigre, IX-1959, M.J. Viana, 10 specimens [JIBC]; Tigre, X-1959, M.J. Viana, 5 specimens [JIBC]; Tigre, I-1961, M. Viana, 5 specimens [JIBC]; Villa Devoto, X-(19)40, leg. H.C. Hepper, 1 specimen [JIBC]; Zárate, I (Isla) Talavera, 30-X-2004, leg. J.E. Barriga, 1 specimen [JIBC]; Zelaya, I-1967, col. H.C. Hepper, 2 specimens [JIBC]; **Catamarca:** Valle Central, Cerro Guacho, 24-IV-2009, 2 specimens [CPCF]; same data except 26-VI-2009, 2 specimens [CPCF]; **Córdoba:** Calamuchita, El Sauce, III-1959, M.J. Viana, 25 specimens [JIBC]; same data except 17-XI-1970, 5 specimens [JIBC]; **Corrientes:** Lavalle, Santa Lucía, 31-X-1961, M.A. Roisillo and M.M. Portillo, s/Malvacea, 2 specimens [JIBC]; Estación experimental Bella Vista, 1-VIII-(19)62, 1 specimen [JIBC]; **Entre Ríos:** 1 de Mayo, VI-1960, leg. H.C. Hepper, 1 specimen [JIBC]; Colón, III-2003, leg. D. Carpintero, luz, 1 specimen [JIBC]; Concordia, 22-III-(19)77, M.M. Portillo, s/Zinnia, 4 specimens [JIBC]; **Formosa:** Estancia La Marcela, 35 km. E. El Colorado, 21-VII-2003 leg. J. Williams and J.E. Barriga-Tuñón, 1 specimen [JIBC]; same data except 21-XII-2004, 5 specimens [JIBC]; **La Rioja:** Patquí, XI-1959, M.J. Viana, 20 specimens [JIBC]; Villa Mazán, Finca de La Fuente, 5-II-2009, leg. Claudia Funes, 4 specimens [CPCF]; same data except 11-IX-2009, 14 specimens [CPCF]; **La Pampa:** Santa Rosa, I-2000, leg. Stortl, luz, 3 specimens [JIBC]; **Mendoza:** La Consulta, 3-X-2003, leg. S.J. Lanati, trampa agua, 1 specimen [CPGG], same data except 19-IX-2003, 25-IX-2003 and 1-X-2003, 3 specimens [CPGG]; **Misiones:** Arroyo Itaembé, II-1996, leg. D. Carpintero, 1 specimen [JIBC]; **Río Negro:** Bariloche, leg. D. Carpintero, 1 specimen [JIBC]; **Salta:** Cafayate, Corralito, X-1986, F.J. Viana, 1 specimen [JIBC]; Rosario de Lerma, I-1983, M.J. Viana, 1 specimen [JIBC]; Rosario de Lerma, XI-1982,

M.J. Viana, 3 specimens [JIBC]; *San Juan*: Pocito, 9-IX-2005, leg. S.J. Lanati, cultivo hinojo, trampa agua, 2 specimens [CPSL]; same data except 1-X-2003, 3-X-2003 and 17-XI-2005, 3 specimens [CPSL], Sapuncay, same data except 6–7/11/2005 and 28–31/1/2005, 3 specimens [CPUD]. **Paraguay**: *Boquerón*: Mistolar, 22°40' S 62°08' W, 3–12/10/1997, leg. Ulf Drechsel, 1 specimen [CPUD], Transchaco Hwy km 420, 22°24' S 59°50' W, 19–28/4/1995, leg. Ulf Dreschel, 1 specimen [CPUD]. *Caazapa*: Tava. *Cordillera*: Naranjo, 30-XII-2005, leg. C. Aguilar, 1 specimen [MHNP]. *Paraguarí*: Sapuncay, Chircal, 23°43' S 66°69' W, 28 a 31-I-2005, leg. Ulf. Dreschel, 2 specimens [CPUD], *Presidente Hayes*: Lollta Yaragui, 14/1/2001, Ulf Drechsel, 1 specimen [CPUD]; *San Pedro*: Río Ypane, XII-1993, leg. M. Viana, 3 specimens [JIBC]; Cororo, Puerto Rosario, 16–21/10/2006, Ulf Drechsel, 1 specimen [CPUD]. **Uruguay**: *Canelones*: Arroyo Vizcaíno (34°37'03.72" S 56°02'32.56" W), 26/I/2012, leg. W.S. Serra, A. Duarte, M. Zarucki, M. Loureiro/MNHN 897/6 specimens [URMU]; Las Toscas (34°45'54.22" S 55°44'17.93" W), 11/I/2012, leg. S. Greco/MNHN, 939/1 specimen [URMU]; *Florida*: Ciudad de Florida. (34°05'55.20" S 56°13'10.78" W), 18/XII/2011, leg. W.S. Serra/MNHN 865/2 specimens [URMU]; same data except 14/I/2012/MNHN 862/2 specimens [URMU]; same data except 25/VII/2011/MNHN 705/1 specimen [URMU]; Montevideo: Casavale, 430/FCC-580; 430/FCC581, 1-3-XII-1934, 429/FCC-579, 3 specimens; 429/FCC-579, 1 specimen "Homeotype", Korschefsky [MNRJ]; Río Negro: Las Cañas (33°09'57.08" S 58°21'32.43" W), 21/IX/2011, leg. W.S. Serra, C. Clavijo and V. Bianchinotti/MNHN 750/5 specimens [URMU]; same data except 22/IX/2011, leg. W.S. Serra, C. Clavijo and V. Bianchinotti/MNHN 751/9 specimens [URMU], same data except 7/XII/2011, leg. W.S. Serra, C. Clavijo and C. de Mello/MNHN 849/7 specimens [URMU], same data except III/2012, leg. W.S. Serra, C. Clavijo and S. González/MNHN 1013/4 specimens [URMU]; *San José*: Paso del arroyo Mauricio (34°40'56.87" S 56°41'20.69" W), 9/I/2012, leg. W.S. Serra/MNHN 834/13 specimens [URMU]; *Treinta y Tres*: La Charqueada, Cabañas de la Intendencia (33°12'13.28" S 53°47'58.09" W), 17/VIII/2011, leg. W.S. Serra/MNHN 742/1 specimen [URMU], same data except 28/IX/2011, leg. W.S. Serra/MNHN 814/1 specimen [URMU].

**New records from Brazil** (31 specimens): *Paraná*: Maringa, Escola Milton Santos, S 26°23'30.83" O 52°1'32.65", 484 m alt. 22 jul 2012, C. Camacho Huerta, 1 specimen [UNAB]. *Santa Catarina*: Concordia (Entre Rios), 84/FCC-216, 1 specimen [MNRJ]; Nova Teutônia, X-1980, F. Plaumann, 4 specimens [DZUP]. *Rio Grande do Sul*: Porto Alegre, III-1928, N.B. Fagundes, 1 specimen [MNRJ]; 16-IX-1932, 1 specimen [MAPA]; I-1940, A. Bento, 1 specimen [MNRJ]; 18-X-1944, 1 specimen; 29-III-1948, 2 specimens; 6-X-1948, 2 specimens; 11-VII-1949, 1 specimen; 12-VIII-1949, 1 specimen; 5-VII-1950, 1 specimen; 31-V-1950, 1 specimen; 14-V-1952, 1 specimen; 27-VIII-1952, 1 specimen; 23-XII-1952, 1 specimen; 29-I-1964, 2 specimens [MAPA]; Bagé, 30-IX-1972, A.R. Jobin, 1 specimen [DZUP]; Cerro Largo (Serro Azul), XII-1943, 2 specimens; Viamão, 11-XI-1964, 4 specimens [MAPA]; XII-1926, Deslandes, 1 specimen [MNRJ].

## Discussion

The taxon *P. bicongregata* was long maintained in synonymy with *P. picta*. However, their morphological characteristics, especially the male genitalia, allow the species to be clearly distinguished (see species key). The presence of *P. bicongregata* in Chile is discarded, since specimens previously assigned to this taxon actually represent the new species described here, *P. pauline* sp. nov. and *P. lueri* sp. nov.

## Conclusion

This revision of the *Psyllobora picta* species complex allowed us to establish the presence of four distinct and geographically quite separate species.

The external similarity of these species and the apparent transitions between them have led specialists to confuse and sometimes synonymize them with each other, making the localities cited in the literature dubious. Study of abundant material allowed us to discard the records of *P. picta* from Paraguay and Uruguay and of *P. bicongregata* from Chile, and to extend the distribution of *P. bicongregata* to Brazil and also to describe two new species from Chile. Analysis of the male genitalia was essential to recognize the species, although the differences observed for some species are minor and sometimes difficult to evaluate in isolated specimens. Fortunately, the combination of this element with the features of design, coloration, geographical distribution and field observations has enabled us to properly identify the species. The female genital tract has not shown any useful characteristics in this group, due to its intraspecific variability, except perhaps the largest spermathecae length/width ratio observed in *P. lueri* with respect to the other species. We take this opportunity to acknowledge the significant contribution of Mader (1957), who, alone among the authors who treated these species in the past, clearly intuited their identity and their correct geographical distributions.

## Conflicts of interest

The authors declare no conflicts of interest.

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