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## First records of Chrysomelidae (Insecta, Coleoptera) on blueberries in Argentina: new associations between native chrysomelids and an exotic crop

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CABRERA, Nora\* and Margarita ROCCA\*\*

\*División Entomología, Museo de La Plata, Universidad Nacional de La Plata, Paseo del Bosque s/n, 1900 La Plata, Buenos Aires, Argentina; e-mail: ncabrera@fcnym.unlp.edu.ar

\*\*Ecología de Plagas, Centro de Estudios Parasitológicos y de Vectores (CEPAVE- CCT-La Plata-CONICET-UNLP), Calle 2 #584, La Plata, Buenos Aires, Argentina; e-mail: mrocca@cepave.edu.ar

### Primeros registros de Chrysomelidae (Insecta, Coleoptera) sobre arándanos en Argentina: nuevas asociaciones entre crisomélidos nativos y un cultivo exótico

■ **ABSTRACT.** The blueberry, *Vaccinium corymbosum* L. (Ericaceae), is a shrub native to the northern Hemisphere introduced in Argentina, where it occupies small cultivated areas mainly in the provinces of Buenos Aires, Entre Ríos and Tucumán. At present, little is known about insects associated with this crop in Argentina. The aim of this study was to identify the species of Chrysomelidae present in blueberry crops in different regions of Argentina, and to present new chrysomelids-blueberry associations. Identification diagnosis, geographical distribution, association with other plants and aspects of their biology is given for each species. Seven species of crop-damaging Chrysomelidae were recorded in blueberry crops of Buenos Aires and Entre Ríos. They belong to the subfamilies Galerucinae: *Diabrotica speciosa* (Germar), *Disonychodes exclamationis* (Boheman), *Caeporis stigmula* Germar, and *Cacoscelis melanoptera* Germar; Eumolpinae: *Percolaspis varia* (Lefèvre), and *Spintherophyta semiaurata* (Klug); and Cryptocephalinae: *Lexiphanes coenobita* Suffrian.

**KEY WORDS.** Leaf beetles. Insect-plant associations. Identification. *Vaccinium corymbosum*.

■ **RESUMEN.** El arándano, *Vaccinium corymbosum* L. (Ericaceae), es un arbusto nativo del hemisferio Norte, que fue introducido en la Argentina donde ocupa pequeñas áreas cultivadas, principalmente en las provincias de Buenos Aires, Entre Ríos y Tucumán. Hasta la actualidad, se conoce poco sobre los insectos asociados con este cultivo. El objetivo de este trabajo es relevar las especies de crisomélidos presentes en los cultivos de arándano de diferentes regiones, y aportar nuevas asociaciones crisomélidos-arándano para la Argentina. Para cada especie registrada, se brinda la diagnosis para su reconocimiento, su distribución geográfica, la asociación con otras plantas y algunos aspectos de su biología. Se registraron siete especies de Chrysomelidae que utilizan el arándano como recurso alimenticio en las provincias de Buenos Aires y Entre Ríos: subfamilia Galerucinae: *Diabrotica*

*speciosa* (Germar), *Disonychodes exclamationis* (Boheman), *Caeporis stigmula* Germar, *Cacoscelis melanoptera* Germar; subfamilia Eumolpinae: *Percolaspis varia* (Lefèvre) y *Spintherophyta semiaurata* (Klug); y subfamilia Cryptocephalinae: *Lexiphanes coenobita* Suffrian.

**PALABRAS CLAVE.** Vaquitas fitófagas. Asociaciones insecto-planta. Identificación. *Vaccinium corymbosum*.

## INTRODUCTION

The blueberry, *Vaccinium corymbosum* L. (Ericaceae), is a perennial shrub native to the northern Hemisphere, where it is an important and traditional crop. In South America, it was introduced as a cash crop in Chile in the '80s, and a decade later in Argentina. At present, this crop continues to expand in our country as a non-traditional productive alternative destined mainly for export. There are currently more than 4,700 hectares cultivated with blueberries, mainly in the provinces of Buenos Aires, Entre Ríos and Tucumán, plus other smaller areas in the provinces of Santa Fe, Corrientes, San Juan, San Luis, Salta, Córdoba, Catamarca, Mendoza, La Pampa, Río Negro and Chubut (Alcover, 2008).

The introduction of an exotic crop implies a change in environmental conditions, mainly in terms of food resources for the communities of herbivores in the ecosystem (Lewinsohn *et al.*, 2005). The herbivorous insects that will adapt more quickly to the use of this crop will be those native or established in the region, and mainly polyphagous (Strong *et al.*, 1984; Rocca, 2010) and ectophagous species (Kennedy & Southwood, 1984).

In spite of the importance of this crop, little is known about diseases and pests that affect its quality and yield in different production regions of Argentina. Studies carried out in Concordia (Entre Ríos) cited about 30 species of herbivores associated with blueberries (Rivadeneira & Bouvet, 2007). They mentioned five families in the Coleoptera: Scarabaeidae, Curculionidae, Melyridae, Melolonthidae, and Chrysomelidae. Only one species was cited for the latter family, *Diabrotica speciosa* (Germar), a polyphagous

pest of many crops.

The Chrysomelidae, known as leaf beetles, is one of the largest families of Coleoptera, with 37,000 described species (Jolivet & Hawkeswood, 1995). Leaf beetles are, with few exceptions, phytophagous and are often monophagous or oligophagous, specialized on different plant organs and/or species. Many species, however, are highly polyphagous. Accordingly, many species are considered agricultural pests while others are valuable agents for biological weed control (Cabrera & Roig-Juñent, 1998; Cabrera, 2004).

The purpose of this paper is to identify species of Chrysomelidae present in blueberry crops in different regions of Argentina, and to provide new chrysomelids-blueberry associations. Additionally, for each species found we included a diagnosis, abbreviated synonyms, host plants, geographical distribution and biological notes.

## MATERIAL AND METHODS

The study was conducted from June 2006 to December 2008 in six blueberry fields situated in the provinces of Buenos Aires and Entre Ríos, two of the most important productive areas in Argentina. Four sites were selected in Buenos Aires: Gobernador Castro (S33°38'9.7'', W59°51'6.4''), San Pedro (S33°42'6.9'', W59°51'8.9''), Chascomús (S35°40'42.7'', W57°56'55.8'') and Colonia Urquiza (S34°57'2.7'', W58°04'55.9''); and two sites in Entre Ríos: Concordia "A" (S31°19'29.09'', W58°01'16.64'') and Concordia "B" (S31°19'29.09'', W58°01'32.93'').

**Table I.** Phenological stages of blueberry crops in Buenos Aires and Entre Ríos provinces, Argentina, month for each stage involved and food resource available.

Phenological stages		Month
V2	Summer budding	Jan-Feb-Mar
V3	Dormancy and presence of senescent leaves	Apr-May
V1-R1	Budding starts, spring budding and flower bud formation	June-July
V1-R2	Spring budding and flowering starts	Ago-Sep
R3	Open flower, fruit formation, unripened fruit	Oct
R4	Ripe fruit	Nov-Dec

adapted from Rivadeneira and Bouvet (2007).

A stratified random sampling design was used in the aerial part of the plant. Sixty sample units were taken monthly in each site. The sample unit consisted of three leaves, three buds, three flowers and three fruit per plant, depending on the phenological stage of the plant (Table I). The samples were taken manually and were placed immediately in plastic bags for transport to the laboratory, where they were identified under a stereoscopic microscope. Identifications of the specimens were confirmed through comparison with specimens held in La Plata Museum (Argentina) which were included in this paper. Diagnostic characters provided for each species are based on easily recognizable external morphological characters. Additional information of their geographic distribution was also obtained from the collection of the Entomological Division of this Museum.

**RESULTS**

**Key to species of Chrysomelidae cited on blueberries in Argentina**

1. Pygidium covered by the elytra, not vertical, intermediate uroesternites not narrowed in the middle, head not or only slightly concealed within prothorax when viewed dorsally ..... 2  
 1`. Pygidium exposed, vertical or almost vertical, intermediate uroesternites more or less narrowed in the middle, head strongly concealed within prothorax when viewed

dorsally. Antennae short, extending to base of elytra. Elytra yellowish brown with piceous areas, punctures ordered in 8-9 longitudinal stripes. Tarsal claws simple .....  
 ..... *Lexiphanes coenobita* Suffrian

2. Antennae far apart in the base (antennal distance generally longer than the length of scape). Front coxae rounded .....3  
 2`. Antennae close together in the base (antennal distance generally shorter than the length of scape). Front coxae conical .....4

3. Medium-sized species, length 6.7-8.0 mm. Body moderately convex, surface deeply punctuate, punctures arranged in longitudinal rows. Head not partially concealed within prothorax. Antennae long, extending a little more than half length of elytra, antennomeres 7-11 elongate, similar in length .....  
 ..... *Percolaspis varia* (Lefevre)

3`. Small-sized species, length less than 5.0 mm. Body strongly convex, surface evenly, finely punctuate. Head partially concealed within prothorax. Antennae short, extending to base of elytra, antennomeres 7-11 distinctly thicker .....  
 ..... *Spintherophyta semiaurata* (Klug)

4. Hind femora distinctly thicker. Tarsal claws appendiculate ..... 5  
 4`. Hind femora not distinctly thicker. Tarsal claws bifid. Elytra parrot green with six oval yellow spots .....

..... *Diabrotica speciosa* (Germar)

5. Medium-sized species, length less than 8.0 mm. Elytral surface finely punctate. .... 6  
5. Medium to large-size species, length 8.0 to 10.0 mm. Pronotal prebasal transverse weakly impressed. Elytra metallic green or blue, surface rugose-punctate .....

..... *Cacoscelis melanopectera* Germar

6. Body length 4.5 to 6.0 mm. Pronotal prebasal transverse weakly impressed. Elytra dark brown to piceous, each elytron with two longitudinal sutural and marginal yellow vittae, surface finely punctate with deep punctures arranged in longitudinal rows .....

..... *Caeporis stigmula* Germar

6. Body length 5.0 to 7.0 mm. Pronotal prebasal transverse deeply impressed. Elytra olive green, each elytron with two longitudinal sutural and submarginal piceous vittae and a small spot near the base .....

..... *Disonychodes exclamationis* (Boheman)

#### Subfamily Cryptocephalinae Tribu Cryptocephalini

*Lexiphanes coenobita* Suffrian 1863  
(Fig. 1)

*Lexiphanes coenobita* Suffrian 1863: 126.

**Diagnosis.** Body broad, convex, surface glabrous, opaque, length 3.0-4.0 mm. Head, mouthparts, legs, scutellum and ventral surface dark brown to piceous. Antennae piceous, surface of antennomeres 1-5 yellowish brown. Pronotum yellowish brown with two rounded black spots on disc and, in some specimens a barely distinct small spot between them. Scutellum piceous. Elytra yellowish brown, each elytron with two piceous areas, one surrounding the scutellum, the other, larger, occupying the apical area. Head completely concealed within the pronotum when viewed dorsally, surface finely punctate. Frons flat, eyes with internal margin deeply emarginated. Antennae short,

extending to base of elytra, antennomeres 1-3 scarcely setose, antennomeres 4-11 densely setose throughout, antennomere 2 globose, antennomeres 5-11 widened and thickened. Pronotum convex, anterior margin arcuate, lateral margins curved, base equal to the width of the elytral base, surface evenly, finely punctate. Elytropleura short, broad, reaching almost half the length of elytra. Elytra almost as wide at the base as at apex, punctures ordered in 8-9 parallel longitudinal stripes. Legs with protibiae deeply notched at base, tarsal claws simple. Pygidium exposed, vertical or almost vertical, intermediate uroesternites more or less narrowed in the middle.

**Distribution.** Brazil, Paraguay, Argentina: Tucumán, Corrientes, Buenos Aires.

**Host plants.** First host-plant record for *Lexiphanes coenobita* in Argentina.

**Material examined.** ARGENTINA. Buenos Aires: Chascomús, 12-III-2007, Rocca col. (MLP), (1 ej.); Estación Delta INTA, 23-25-IV-2010, Cabrera col. (MLP) (6 ejs.).

#### Subfamily Eumolpinae Tribu Eumolpini

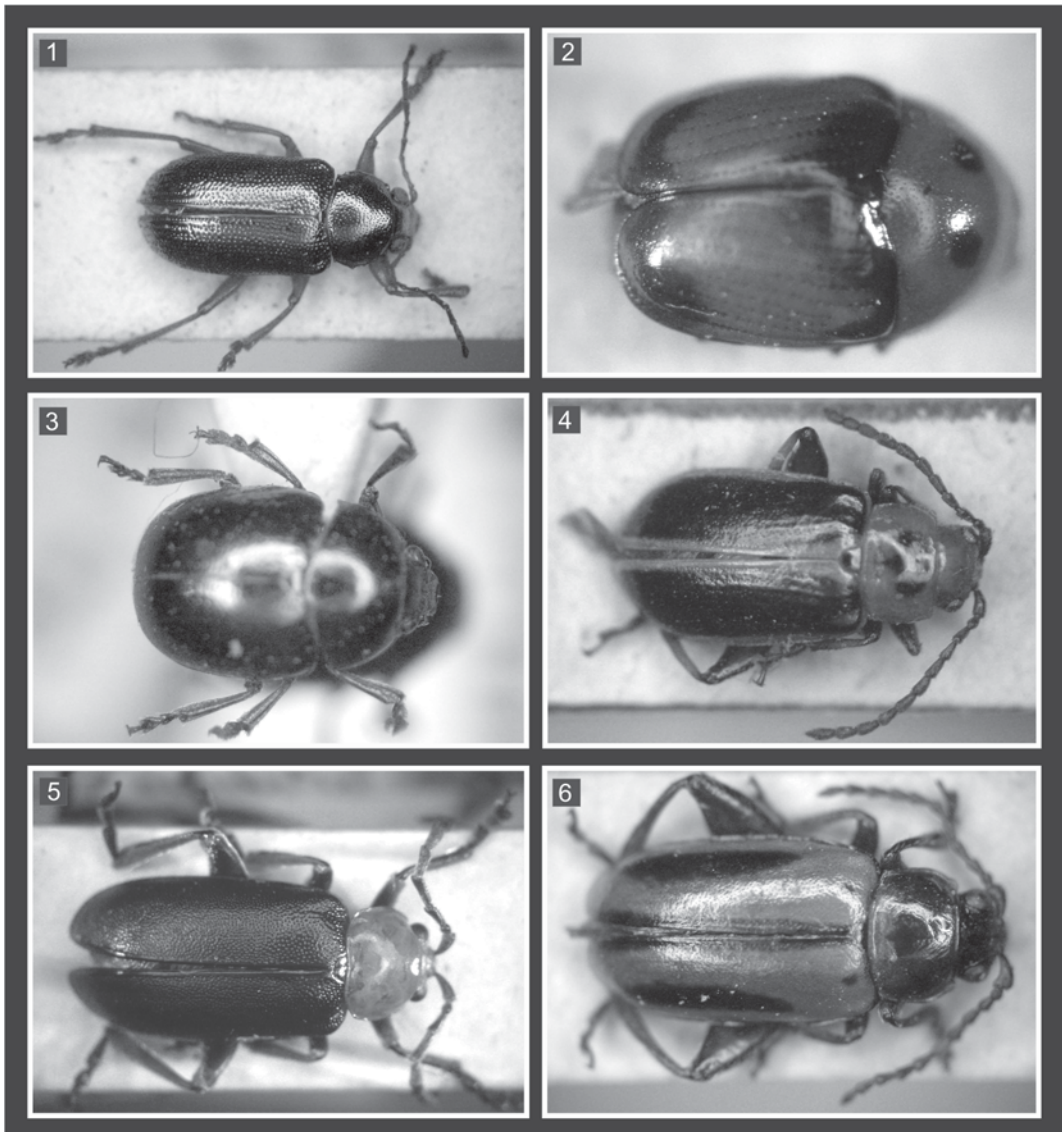
*Percolaspis varia* (Lefèvre, 1884)  
(Fig. 2)

*Colaspis varia* Lefèvre, 1884: clv.

*Maecolaspis varia*: Bechyné, 1950: 1079.

*Percolaspis varia*: Bechyné, 1957: 240.

**Diagnosis.** Body oval, moderately convex, length 6.7-8.0 mm. Color bronzed or metallic green, antennomeres 1-6 yellowish brown, antennomeres 7-11 dark brown. Legs yellowish brown. Venter dark brown. Vertex coarsely punctate, punctures somewhat dispersed in frons. Eyes with internal margin scarcely emarginated. Frons flat with sparse, well impressed punctures, clypeus deeply notched. Antennae extending a little more than half length of elytra, all antennomeres with 2-4 setae at apex, antennomeres 7-11 densely setose throughout; antennomere 2 globose, short, less than 2X the length of 3, antennomeres 3-11 elongate, similar in



**Figs. 1-6.** 1, *Lexiphanes coenobita* Suffrian; 2, *Percolaspis varia* (Lefèvre); 3, *Spintherophyta semiaurata* (Klug); 4, *Cacoscelis melanopectera* Germar; 5, *Caeporis stigmula* Germar; 6, *Disonychodes exclamationis* (Boheman).

length. Pronotum slightly convex, surface densely punctate, punctures somewhat coarser than on head; scarcely 2X wider than long, lateral margins dentate at middle. Elytra convex, surface densely, deeply punctate, punctures arranged in longitudinal rows. Legs with anteapical margin of mesotibiae not emarginated. Tarsal claws appendiculate.

**Distribution.** Brazil, Uruguay, Argentina: Buenos Aires, Corrientes, Entre Ríos, Santa Fe, Córdoba and La Pampa.

**Host plants.** Adults of this species are cited for immature fruits. They have been recorded in banana (*Musa paradisiaca* L.) and mint (*Mentha* L.). They have also been recorded feeding on rose flowers (*Hibiscus curtifolia* L.), peach (*Prunus persica* L.), pear (*Pyrus communis* L.) and apple trees (*Malus domestica* Borkh.) (Cabrera, 2004) in Brazil. Adults feed on leaves, larvae are radicolous.

**Biological notes.** This species was found

at every site in Buenos Aires and Entre Ríos, mainly during the phenological stages R4 and V2. During those stages the plant provides, as a food resource, leaves and buds. The highest abundance of this species was recorded in the fields of Chascomús ( $1.05 \pm 0.19$  individuals/sample unit) and San Pedro ( $0.54 \pm 0.25$  individuals/sample unit), next to soybean plots, suggesting that its occurrence could be related to the proximity to this crop.

**Material examined.** ARGENTINA. Buenos Aires: Chascomús, 30-I-2007, Rocca col. (MLP), (1 ej.); Estación Delta INTA, 23-25-IV-2010, Cabrera col. (MLP) (20 ej.); Gobernador Castro, 20-X-2006, Rocca col. (MLP), (3 ej.); San Pedro, 29-II-2006, Rocca col. (MLP), (3 ej.), 18-XII-2006, Rocca col. (MLP), (2 ej.), 4-IX-2009, Cabrera col. (MLP) (8 ej.); Otamendi, 4-IX-2009, Cabrera col. (MLP) (8 ej.), 22-IV-2010, Cabrera col. (MLP) (12 ej.). Entre Ríos: Concordia, 17/II/05, Rocca col. (MLP), (2 ej.).

*Spintherophyta semiaurata* (Klug, 1829)  
(Fig. 3)

*Colaspis semiaurata* Klug, 1829: 10.

*Noda cuprescens* Boheman, 1858: 165.

*Chrysodina semiaurata*: Léfèvre, 1875: 103.

*Spintherophyta semiaurata*: Bechyné, 1957: 226.

**Diagnosis.** Body oval, strongly convex, sides uniformly curved, length 3.0-5.0 mm. Head and pronotum bronzed, clypeus piceous, elytra metallic green. Antennomeres chestnut, darker towards the apex, dorsal surface of antennomeres 1-5 yellowish brown. Legs and ventral surface darker than the dorsal surface. Head partially concealed within the pronotum when viewed dorsally. Vertex finely punctate. Eyes with anterior margin slightly emarginated. Frons flat, deeply punctured. Antennae short, extending to base of elytra, all antennomeres with 2-4 setae at apex, antennomeres 7-11 densely setose throughout, antennomere 2 globose, the other antennomeres elongate, antennomeres 7-11 distinctly thicker. Pronotum convex, slightly wider than long, surface minutely

punctured, narrowed towards the front, posterior margin sinuate. Elytra moderately convex, surface even, finely punctate. Legs with femora slightly enlarged, tarsal claws appendiculate.

**Distribution.** Argentina: Córdoba, Misiones, Buenos Aires.

**Host plants.** Adults of this species have been recorded feeding on rose flowers (*Hibiscus curtifolia* L.), peach (*Prunus persica* L.), and *Citrus* sp. (Cabrera, pers. com.).

**Material examined.** ARGENTINA. Buenos Aires: Colonia Urquiza, 18-XII-2006, Rocca col. (MLP), (2 ej.); Chascomús, 30-XI-2006, Rocca col. (MLP) (1 ej.); Estación Delta INTA, 23-25-IV-2010, Cabrera col. (MLP) (12 ej.); Otamendi, 4-IX-2009, Cabrera col. (MLP) (18 ej.), 22-IV-2010, Cabrera col. (MLP) (19 ej.); San Pedro, 29-II-2006, Rocca col. (MLP), (1 ej.), 15-XII-2008, Rocca col. (MLP), (1 ej.), 4-IX-2009, Cabrera col. (MLP) (5 ej.). Entre Ríos: Concordia, 17/II/05, Rocca col. (MLP), (2ej.).

Subfamily Galerucinae  
Tribe Galerucini

*Diabrotica speciosa* (Germar, 1824)

*Galeruca speciosa* Germar, 1824: 602.

*Diabrotica speciosa*: Dejean, 1837: 404;  
Baly 1890: 41.

**Diagnosis.** Body oblong, oval, slightly convex, length 3.70-5.0 mm. Head dark brown. Antennae chestnut, inner surface and apex of antennomeres 1-3 tinged with green, antennomere 11 dark brown at apex. Scutellum and basal area of elytra dark brown. Elytra parrot green, each elytron with three oval, yellow spots at middle area of disc. Coxae and femora light green, tibiae and tarsi dark brown to piceous. Venter: prosternum parrot green, metasternum piceous, mesosternum and abdomen yellowish tinged with brown. Vertex finely and sparsely punctate; antennal calli subquadrate, distinctly convex. Eyes with internal margin straight. Frontal ridge moderately raised in lateral view. Antennae extending to half

length of elytra; antennomeres 2-3 short, together more than one half the length of antennomere 4; antennomeres 1-4 scarcely setose, antennomeres 5-11 densely setose throughout, genal space small, less than one fourth the maximum ocular length. Pronotum convex, surface smooth; posterolateral fovea weakly impressed; one long thin seta on each anterolateral and posterolateral angle. Elytra with surface densely and irregularly punctate, punctures somewhat coarser than on pronotum. All legs similar; with tibiae dorsally carinate, meso-metatarsiae with short spurs. Tarsal claws bifid.

**Distribution.** This species is widely distributed in the Neotropical region. In Argentina, *D. speciosa* is recorded in all northern and central provinces, as well as in Rio Negro and Neuquén provinces (approximately 40° S), thus far representing the southern limit of the species' distribution (Cabrera Walsh & Cabrera, 2004).

**Host plants.** Adults of *D. speciosa* feed on numerous wild and cultivated plants, sometimes causing significant damage (Christensen, 1943; Arce de Hamity & Neder de Román, 1984; Cabrera 2004; Cabrera Walsh & Cabrera, 2004). The latter authors mention over 60 species of host plants including grasses, solanaceous, malvaceous, rutaceous and cucurbitaceous plants. *D. speciosa* has been recorded feeding on blueberries in Concordia (Entre Ríos) (Rivadeneira & Bouvet, 2007).

**Biological notes.** The reproductive biology, larval and adult host range of *D. speciosa* were described by Cabrera Walsh (2001, 2003), Cabrera Walsh & Cabrera (2004). De Pecchioni (1988) described the immature stages and Cabrera Walsh (2001) and De Pecchioni *et al* (2000) provided population data for *D. speciosa*. In blueberry, adults of this species were collected in low densities ( $0.07 \pm 0.02$  individuals per sample unit) in phenological stages of V2 and V3. In these stages, the plants provide buds, and fresh and mature leaves.

**Material examined.** ARGENTINA. Buenos Aires: Chascomús, 30-I-2007, Rocca col. (MLP) (1 ej.), 14-II-2007, Rocca col. (MLP) (2 ej.); Estación Delta INTA, 26-IV-2010,

Cabrera col. (MLP) (10 ej.); San Pedro, 21-V-2007, Rocca col. (MLP) (1 ej.), 30-IV-2008, Rocca col. (MLP) (2 ej.), 4-IX-2009, Cabrera col. (MLP) (12 ej.). Entre Ríos: Concordia, 17-II-2005, Rocca col. (MLP) (5 ej.).

### Tribe Alticini

#### *Cacoscelis melanopectera* Germar, 1821 (Fig. 4)

*Cacoscelis melanopectera* Germar, 1821: 174.

**Diagnosis.** Body elongate, oblong, length 8.0-10.0 mm. Head, mouthparts, pronotum and scutellum yellowish brown, labrum and labial palpi dark brown. Antennae dark brown to piceous, ventral surface of antennomeres 1-3 yellowish. Legs piceous. Scutellum and elytra usually metallic blue, in same specimens surface rather opaque. Venter: prosternum, meso-metasternum and abdomen piceous. Head nearly as broad as long, surface slightly punctate; antennal calli flat, subtriangular. Eyes with internal margin straight. Frontal ridge short, convex, raised, higher than antennal calli. Antennae, extending a little more than half length of elytra, antennomeres 1-2 scarcely setose, antennomeres 3-11 densely setose throughout, antennomere 2 globose, the other antennomeres elongate, similar in length. Pronotum transversely quadrate, sides slightly rounded; surface very shiny, evenly punctate, pronotal prebasal transverse weakly impressed. Scutellum rounded. Elytra rugose-punctate. Legs moderately fusiform, tarsal claws appendiculate.

**Distribution.** Widely distributed, from Mexico to Brazil, Paraguay, Uruguay, Argentina: Misiones, Tucumán, Santiago del Estero, Chaco, Corrientes, Córdoba, Mendoza and Buenos Aires.

**Host plants.** Adults have been recorded in large numbers on *Passiflora sp.*, while the larvae live and develop in root thickenings (Bosq, 1943).

**Biological notes.** This species was only recorded in Concordia, in the phenological stage V1/R2 and R3 when the plant offers leaves, flowers and immature fruits.

**Material examined.** ARGENTINA. Buenos Aires: Estación Delta INTA, 25-IV-2010, Cabrera col. (MLP) (2 ejs.); San Pedro, 4-IX-2009, Cabrera col. (MLP) (6 ejs.). Entre Ríos: Concordia, 22-VIII-2006, Rocca col. (MLP) (2 ejs.).

*Caeporis stigmula* Germar, 1824  
(Fig. 5)

*Caeporis stigmula* Germar, 1824: 602.

**Diagnosis.** Body oblong to elongate, slightly convex, length 4.5-6.0 mm. Head and pronotum yellowish, labrum and mouthparts dark brown, some specimens possess a piceous spot at the base of vertex. Antennae dark brown, ventral surface of antennomeres 1-3 yellowish. Disc of pronotum with two piceous rounded spots, in some specimens these spots are fused as an irregular dark brown spot. Legs dark brown, ventral surface of tibiae tinged with brown, basal three-fourth surface of metatibiae yellowish. Scutellum and elytra dark brown to piceous. Elytra dark brown to piceous, each elytron with two longitudinal yellow vittae, one sutural vitta and one marginal extending from humeral calli, the vittae wholly confluent at apex. Venter: prosternum yellowish, meso-metasternum and abdomen dark brown. Head with surface sparsely punctate, somewhat coarser than on pronotum; antennal calli convex, roundish, close together separated by a deep suture. Eyes with internal margin straight. Frontal ridge moderately short, raised in lateral view. Antennae extending to half length of elytra, antennomere 2 shorter than 3, 3-6 elongate, similar in length, 7-10 subquadrate, antennomeres 1-4 scarcely setose, antennomeres 5-11 densely setose. Pronotum rectangular, 2X wider than long; surface finely and sparsely punctate; prebasal transverse impression weakly impressed. Elytra surface finely punctate with deep punctures arranged in longitudinal rows. All legs similar; metafemora moderately enlarged; tarsal claws appendiculate.

**Distribution.** Brazil, Bolivia, Paraguay,

Uruguay, Argentina: Buenos Aires, Mendoza, Santiago del Estero, Río Negro. **New record for Argentina:** Entre Ríos province.

**Host plants.** Adults feed on wild and cultivated crucifers: cabbage (*Brassica oleracea* var. *viridis* L.), radish (*Raphanus sativus* L.), turnip (*Brassica rapa* L.) and cress (*Lepidium sativum* L.) (Bosq 1943, Cabrera 2004).

**Biological notes.** In blueberry crop of San Pedro *C. stigmula* was recorded during the phenological stage V1/R1 and R4. In the first the plant offers mainly mature leaves, and in the second one the plant offers leaves and fruits as a resource. In Concordia, this species appears in V1/R2 and R3 when plants offer leaves, flowers and immature fruits.

**Material examined.** ARGENTINA. Buenos Aires: Estación Delta INTA, 25-IV-2010, Cabrera col. (MLP) (7 ejs.); Otamendi, 22-IV-2010, Cabrera col. (MLP) (12 ejs.); San Pedro, XII-2005, Rocca col. (MLP) (6 ej.), 5-VII-2006, Rocca col. (MLP) (6 ejs.). Entre Ríos: Concordia, 22-VIII-2006, Rocca col. (MLP) (2 ejs.).

*Disonychodes exclamationis* (Boheman,  
1859)  
(Fig. 6)

*Systema exclamationis* Boheman, 1859:  
192.

*Prasona exclamationis*: Blake, 1951: 138,  
146.

*Disonychodes exclamationis*: Bechyné,  
1955: 15.

**Diagnosis.** Body oblong-oval, moderately convex, length 5-7mm. Color olive green. Head and mouthparts chestnut, in some specimens head tinged with piceous, labrum piceous. Antennae chestnut, dorsal surface of antennomere 1 and apex of the other antennomeres dark brown. Pronotum with one rounded dark brown spot at the base, pronotal prebasal transverse deeply impressed Scutellum piceous. Each elytron with two longitudinal piceous vittae, submarginal vitta extending behind humerus to one-fourth the length of elytron, sutural



vitta surrounding the scutellum extending almost to apex and a small spot near the base. Legs dark brown, tibiae light brown. Venter dark brown to piceous. Head. Vertex finely punctuate; antennal calli oval, moderately convex. Eyes with internal margin slightly emarginated. Frontal ridge short, moderately convex. Antennae extending less than half length of the body, antennomeres 1-4 scarcely setose, antennomeres 5-11 densely setose, antennomere 2 short, antennomeres 3-10 elongate, antennomere 11 apically acuminate. Pronotum slightly convex; surface even, finely punctuate; wider than long, sides distinctly narrowed near the base; anterolateral and posterolateral angles each bearing one long seta, prebasal transverse impression weakly impressed. Elytra with surface irregularly punctuate, coarser than on pronotum. Legs with metafemora moderately broad, dorsolateral apex of metatibiae with row of long, thick spines. Tarsal claws appendiculate.

**Distribution.** Brazil, Paraguay, Argentina: Buenos Aires, Entre Ríos, La Pampa.

**Host plants.** Chard (*Beta vulgaris* var. *cicla* (L.) K Koch), red pepper (*Capsicum annum* L.), wild artichoke (*Cynara cardunculus* L.), globe artichoke (*C. scolymus* L.), sunflower (*Helianthus annuus* L.), garden tomato (*Lycopersicon esculentum* L.), alfalfa (*Medicago sativa* L.), tobacco (*Nicotiana tabacum* L.), horseshoe geranium, (*Pelargonium zonale* (L.) Hér ex Aiton), eggplant (*Solanum melongena* L.), irish potato (*S. tuberosum* L.), wheat (*Triticum sp.*), spiny cocklebur *Xanthium spinosum* L. (Bosq, 1943; Silva *et al.*, 1968; Cabrera 2004).

**Biological notes.** This species occurred during the phenological stage R4, when the plant offers leaves and fruits as a resource. It was recorded in Colonia Urquiza in very low densities ( $0.07 \pm 0.04$  individuals/sample unit). Adults damage blueberry plants by eating the lower surface and mesophyll of the leaf, leaving an exposed lacy network of fine veins, this is called "skeletonizing". Subsequently, the upper surface of the leaf turns brown.

**Material examined.** ARGENTINA. Buenos

Aires: Colonia Urquiza, 11-XII-2008, Rocca col. (MLP) (4 ejs.); Estación Delta INTA, 25-IV-2010, Cabrera col. (MLP) (15 ejs.); San Pedro, 3-IX-2009, Cabrera col. (MLP) (12 ejs.).

## DISCUSSION

Seven species of Chrysomelidae were recorded, four of them belong to the subfamily Galerucinae: *Diabrotica* Chevrolat (tribu Galerucini), *Caeporis* Chevrolat, *Disonychodes* Bechyné, *Cacoscelis* Chevrolat (tribu Alticini), two to the subfamily Eumolpinae (*Percolaspis* Bechyné, *Spintherophyta* Dejean) and one to the subfamily Cryptocephalinae (*Lexiphanes* Gistel).

The only species of Chrysomelidae cited for Argentina on blueberry to date is *Diabrotica speciosa* (Rivadeneira & Bouvet, 2007). This work is the first reference of other chrysomelid species which used the blueberry as a food resource in our country.

Adults of Galerucinae and Eumolpinae subfamilies have a broad host range. The Cryptocephalinae were considered as relatively polyphagous (Erber, 1988) and adults prefer green leaves and bushes, but some also feed on petals or are pollen feeders (Jolivet, 1978). The species most frequently found on blueberries were *Diabrotica speciosa* and *Percolaspis varia*. *D. speciosa* was collected in buds and young leaves in the stages of V2 and V3, whereas *P. varia* was present in R4 and V2.

The occurrence of polyphagous species was linked to its presence in surrounding crops, as is the case of *P. varia* and *D. speciosa*. These species are listed as common in soybean fields of Argentina (Molina, 1992; Cabrera Walsh & Cabrera, 2004), and the blueberry sites in Chascomús and San Pedro, where *P. varia* and *D. speciosa* were recorded, were surrounded by this crop.

Many of the species found could be rare and/or tourists that use the crop as a transit point or resting place, and therefore are found infrequently or in low abundance. Besides, blueberry has no taxonomic affinity

with other plants in the region (Catálogo de plantas vasculares de la Argentina, 2011), so it is not unexpected to find only polyphagous species. The low number of *Lexiphanes* found could also be due to the fact that Cryptocephalinae species tend to be rare. Also, many species live cryptically or let themselves fall at the slightest disturbance (Erber, 1988).

While adults of the species of Eumolpinae and Galerucinae feed on the aerial parts of plants, larval feeding habits vary even within these subfamilies. The larvae of all Eumolpinae and some Galerucinae (both tribes Alticini and Galerucini) feed on the roots of various plants, although other larvae of Galerucinae feed on the leaves. The larvae of all species studied here are root feeders, and because this study only sampled the aerial part of plants, the presence of larvae was not detected. The Cryptocephalinae members have an unusual life cycle. Females cover their eggs with fecal plates, building an egg case, which is subsequently worn as a protective case by the larva and is enlarged as it grows. Most Cryptocephalinae larvae appear in leaf litter, feeding on decaying plants, or upon cryptogamic plants growing on stones (Erber, 1988). Others, like *Lexiphanes* for example, seem to feed on fresh leaves, as LeSage (1984) recorded larvae climbing on to plants.

Results presented here are an initial survey to establish the pool of leaf beetles present on blueberries. New collections in the future, including the immature stages, will allow to confirm the establishment and abundance of species mentioned here and the emergence of new ones. Moreover, it would also be interesting to know the distribution of the association of leaf beetles with blueberries in other areas of the country where climatic and environmental conditions are different.

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