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The genera of Chrysomelinae (Coleoptera: Chrysomelidae) in Costa Rica

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Abstract: Keys in Spanish and English are given for the genera of Chrysomelinae known from Costa Rica. For each genus, a list of species compiled from collections in the University of Costa Rica, the National Biodiversity Institute, and the entomological literature is presented. The genus *Planagetes* Chevrolat 1843 is recorded for the first time from Central America, and the genus *Leptinotarsa* Stål 1858 is synonymized with *Stilodes* Chevrolat 1843.

Key words: Chrysomelinae, keys, *Planagetes*, *Stilodes*, *Leptinotarsa*.

Members of the subfamily Chrysomelinae –popularly known in Costa Rica as "confites con patas" (walking candies)– are among the largest and most colorful representatives of the family Chrysomelidae in Costa Rica. They are of broad ecological interest because of their host plant preferences and varying modes of life. Although readily noticed, there are no keys to the Neotropical fauna for identification of either species or genera, and many taxonomic problems persist in this subfamily. The only recent generic key for this region was published in 1965 by Jan and Bohumila Bechyné for Venezuela. To assist present and future workers studying this group, a modified version of their key for genera known to occur in Costa Rica is presented in English and Spanish. This is followed by notes on the diversity of the individual genera in Costa Rica with a list of both species identified in the collections of the University of Costa Rica and the National Biodiversity Institute (INBio) and those recorded from Costa Rica in the catalogs of Blackwelder (1947) and Bechyné (1952), along with a discussion of the taxonomic status of *Stilodes* and *Leptinotarsa*.

Clave para los géneros de Chrysomelinae conocidos de Costa Rica
(adaptada de Bechyné & Bechyné 1965)

1. Uñas tarsales simples (Fig. 2), tibias no anguladas dorsalmente; primer esternito abdominal sin costillas semicirculares 2
   Uñas tarsales apendiculadas (Fig. 1), lados externales de las tibias con angulo obtuso en el cuarto apical; primer esternito abdominal con costillas semicirculares (Fig. 10) . . . . . .PHYLLOCECTINI *Planagetes*

2. (1) Margen apical del los epipleuros con una hilera de setas cortas (Fig. 4) . . . . . .DORYPHORINI 3
   Margen apical del los epipleuros glabros . . . . . .CHRYSOMELINI 9

3. (2) Prosterno sin proceso intercoxal, mesosterno sin una espina distinta (Fig. 8) 4
   Proceso intercoxal del prosterno alto, o mesosterno con una espina distinta dirigida hacia adelante (Fig. 7, 9) . .7

4.(3) Tercer segmento del palpo maxilar a menudo más larga y ancha que el segundo (Fig. 5); élitro blanco, blanco-amarillo, o blanco-rosado con rayas oscuras o un patron complejo de manchas oscuras (Fig. 11) 5
Tercer segmento del palpo maxilar a menudo más corta y delgada que el segundo (Fig. 6); élitro nunca blancuzco con muchas manchas oscuras 6

5. (4) Uñas tarsales contiguas (Fig. 3) . . . . . .*Zygogramma*
Uñas tarsales divergentes (Fig. 2) . . . . . .*Calligrapha*

6. (4) Mesosterno sobresale un poco bajo del prosterno; fémur delantero del macho con una muesca honda *Labidomera*
Mesosterno continuo con el prosterno; fémur delantero simple en ambos sexos *Stilodes* (incluyendo *Leptinotarsa*)

7. (3) Proceso intercoxal del prosterno alto y prominente; mesosterno continuo con el prosterno (Fig. 7) . . . . . .*Desmogramma*
Prosterno normal, mesosterno con una espina mediana a grande dirigido hacia adelante (Fig. 9) 8

8. (7) Uñas tarsales contiguas . . . . . .*Doryphora*
Uñas tarsales divergentes . . . . . .*Platyphora*

9.(2) Puntos de los élitros en filas longitudinales . . . . . .*Phaedon*
Puntos de los élitros desordenados 10

10.(9) Pronoto con surcos laterales longitudinales . . . . . .*Chrysomela*
Pronoto sin surcos laterales longitudinales . . . . . .*Plagiodera*

Key to the genera of Chrysomelinae known to occur in Costa Rica

(adapted from Bechyné & Bechyné 1965)

1. Tarsal claws simple (Fig. 2), tibiae not angulate dorsally; abdominal sternite 1 without costae 2
Tarsal claws appendiculate (Fig. 1), tibiae obtusely angulate in apical fourth; abdominal sternite 1 with two semicircular costae (Fig. 10) . . . . . .PHYLLOCECTINI *Planagetes*

2. (1) Elytral epipleuron with apical margin bearing a row of short setae (Fig. 4) . . . . . .DORYPHORINI 3
Elytral epipleuron with apical margin bare . . . . . .CHRYSOMELINI 9

3. (2) Prosternum not raised anterior to fore coxae, mesosternum lacking a distinct horn (Fig. 8) 4
Prosternum sharply angled upward anterior to fore coxae, or mesosternum with a distinct horn directed anteriorly (Fig. 7, 9) 7

4.(3) Third segment of maxillary palp usually longer and wider than second; elytra white, yellowish white or pinkish white with dark stripes or a complex pattern of dark spots (Fig. 11) 5
Third segment of maxillary palp generally shorter and narrower, or subequal to second; elytra variously colored but never whitish with numerous dark spots 6

5. (4) Tarsal claws fused at base (Fig. 3) . . . . . .*Zygogramma*
Tarsal claws completely separated (Fig. 2) . . . . . .*Calligrapha*

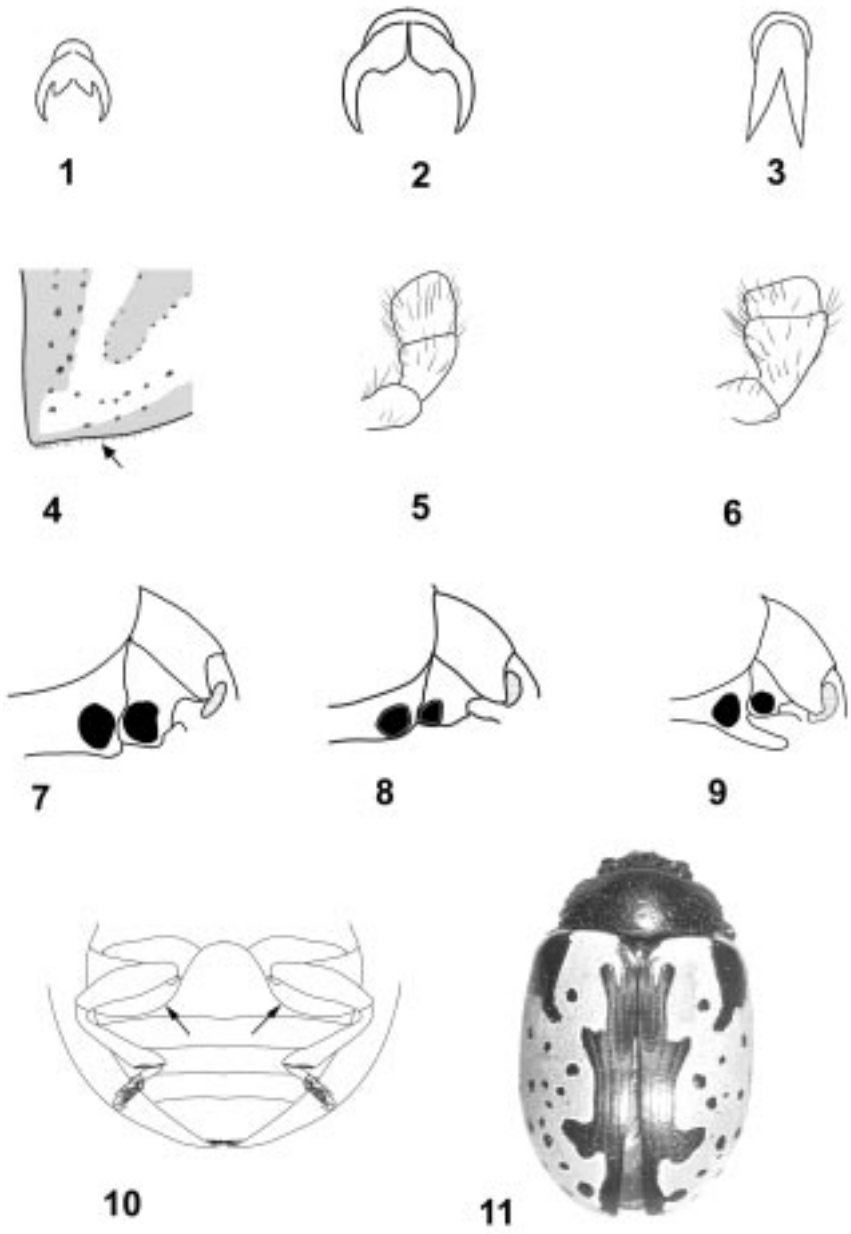
6. (4) Mesosternum projects slightly below the prosternum; fore femur of male with a deep notch . . . . . .*Labidomera*
Mesosternum continuous with prosternum; fore femur of both sexes simple . . .*Stilodes* (including *Leptinotarsa*)

7. (3) Prosternum sharply angled upward anterior to forecoxae; mesosternum continuous with prosternum (Fig. 7) . . . . . .*Desmogramma*
Prosternum flat, mesosternum produced as a medium to large curved horn (Fig. 9) 8

8. (7) Tarsal claws fused at base . . . . . .*Doryphora*
Tarsal claws completely separated . . . . . .*Platyphora*

9.(2) Elytral punctation in longitudinal striae . . . . . .*Phaedon*
Elytral punctation confused 10

10.(9) Pronotum with lateral longitudinal impressions . . . . . .*Chrysomela*
Pronotum lacking lateral longitudinal impressions . . . . . .*Plagiodera*



Figs. 1-3, tarsal claws: 1, *Planagetes*; 2, *Calligrapha*; 3, *Zygogramma*. Fig. 4, apex of elytron of *Zygogramma*: row of setae indicated by arrow. Fig. 5-6, maxillary palpi: 5, *Zygogramma*; 6, *Platyphora*. Fig. 7-9, side view of thorax: 7, *Desmogramma*; 8, *Stilodes*; 9, *Platyphora*. Fig. 10, underside of abdomen of *Planagetes*: semicircular ridges indicated by arrows. Fig. 11, dorsal view of *Calligrapha ramulifera*.

Notes on the genera

Calligrapha Chevrolat 1837

Adult specimens of all species have white, pale yellow, or pale rose elytra with intricate patterns of dark markings. Twelve species are presently known from Costa Rica:
Calligrapha argus Stål
Calligrapha diversa (Stål)
Calligrapha elegantula Jacoby
Calligrapha fulvipes Stål
Calligrapha gyllenhali Stål
Calligrapha notatipennis Stål
Calligrapha pantherina Stål
Calligrapha ramulifera Stål
Calligrapha serpentina (Rogers)
Calligrapha sponsa Stål
Calligrapha subdentata Bechyné
Calligrapha tortilis Stål

Chrysomela Linné 1758

Several specimens of *Chrysomela scripta* (Fabr.), a Nearctic species, have recently been collected from higher elevations. In one case, the species was damaging planted alder trees.

Desmogramma Erichson 1847

One species, *Desmogramma conjugata* Stål, is known from Costa Rica.

Doryphora Illiger 1807

Two species occur in Costa Rica and are the largest members of the Costa Rican chrysomelid fauna.
Doryphora bioleyi (Achard)
Doryphora paykulli (Stål)

Labidomera Chevrolat 1837

One species, *Labidomera suturella* Guérin-Méneville occurs in Costa Rica. Choe (1989) reported maternal care in this species.

Phaedon Latreille 1829

Three species are recorded from Costa Rica:
Phaedon cyanescens Stål
Phaedon mexicanum Jacoby
Phaedon ruficeps Achard

Plagiodera Chevrolat 1837

Three species are known from Costa Rica.
Plagiodera atritarsis Stål
Plagiodera bistripunctata Duvivier
Plagiodera quadrimaculata Jacoby

Planagetes Chevrolat 1843

One species, *Planagetes uniformis* (Jacoby) **new combination** occurs in Costa Rica. Jacoby described this species in *Plagiodera*, noting its small round body outline and its similarity to a coccinellid. However, this species has appendiculate claws and angulate tibia, both characters of *Planagetes* (Bechyné & Bechyné 1965). This is a new Central American generic record. Along with its coccinellid-like habitus, *P. uniformis* has semi-circular costae on the first abdominal sternum behind the metacoxae (Fig. 10), a character also found in many Coccinellidae.

Platyphora Gistl 1857

This is the largest genus of Chrysomelinae in Costa Rica. Twenty-three species are known and many as-yet unidentified specimens have also been collected. Vivipary has been observed in at least two Costa Rican species and is known from a number of South America species. However, the biology of most of the species is still unknown.
Platyphora arangoi (Jacoby)
Platyphora bicolor (Jacoby)
Platyphora biremis (Stål)
Platyphora decorata (Jacoby)
Platyphora decurrens (Stål)

Platyphora eucosoma (Stål)
Platyphora flavoguttata (Jacoby)
Platyphora ligata (Stål)
Platyphora macrogramma Bechyné
Platyphora nigroguttata (Stål)
Platyphora nr. *lativittis* (Jacoby)
Platyphora ocellata (Jacoby)
Platyphora ornata (Jacoby)
Platyphora panamensis (Jacoby)
Platyphora petulans (Stål)
Platyphora punctipennis (Jacoby)
Platyphora purulensis (Jacoby)
Platyphora rogersi (Jacoby)
Platyphora salvini (Baly)
Platyphora selva Daccordi
Platyphora semiviridis (Jacoby)
Platyphora spectabilis (Stål)
Platyphora spectanda (Stål)
Platyphora uniformis (Jacoby)

Stilodes Chevrolat 1843
Leptinotarsa Stål 1858 **new synonymy**

Although it contains one of the most studied animals on Planet Earth, the genus *Leptinotarsa* has never been adequately differentiated from other genera in the Doryphorini. Given the enormous economic impact of the Colorado Potato Beetle, *Leptinotarsa decimlineata* (Say), and the increasing interest in finding some alternative to pesticide control, it is strange that the status of the genus *Leptinotarsa* has not attracted more interest. Jacoby (1880-1892), in the *Biologia Centrali Americana* noted the high degree of similarity between *Leptinotarsa* and *Stilodes* and the difficulty in correctly assigning some of the Central American species. Stål (quoted by Jacoby) recognized *Leptinotarsa* on the basis of the last segment of the maxillary palp which he described as shorter than the penultimate, and truncate. Chapuis (1875) used the longer length of the tibial groove to separate *Leptinotarsa*. Bechyné and Bechyné (1965) used the form of the antennae; short and subclavate in *Stilodes*, filiform in *Leptinotarsa*. The only recent attempt at a taxonomic treatment was Jacques' (1988) short booklet on *Leptinotarsa*, but this work ignored the species south of Mexico, and comparisons with other genera were limited to meaningless tabulations of species numbers among North American Doryphorini. Likewise, Hsiao (1988) compared *Leptinotarsa* only to other Nearctic Doryphorini. Neither author mentioned *Stilodes*.

After studying four species assigned to *Leptinotarsa* and seven species assigned to *Stilodes* in the INBio collection, I conclude that none of these characters is reliable. Most species in both these genera have the last two segments of the maxillary papli subequal, and in neither genus is the last segment consistently longer or shorter than in the other (they are truncate in all the species). Indeed, the last segment appears to be somewhat retractable into the third segment because in some specimens the length ratios are noticeably different from side to side.

The tibial groove is also an unreliable character. In species assigned to *Leptinotarsa* it purportedly runs down the entire apical half of the tibia while it is confined to the apical third in those of *Stilodes*. However, in all species the beginning of the groove is extremely shallow somewhere between the apical half or third of the tibia. The angle of the light can often change the point at which the groove appears to begin. Jacoby also noted the variability of this character.

Finally, there is no difference in shape of the antennae between the two genera in Costa Rica. All have the apical antennomeres somewhat thicker than the basal antennomeres.

Examination of the male and female genitalia also failed to provide any consistent characters for separation. The spermathecae of most of the species in both genera had the same general form, and showed as much intra- as intergeneric variation. The aedeagi were similar except for some differences in the apex of the median lobe. In Costa Rican *Stilodes* the lateral margins are sinuate (viewed from the side), while in *Leptinotarsa* they are evenly curved. At least one other species of *Leptinotarsa*, however, also has a sinuate apicolateral margin of the

median lobe (Jaques 1988). Nor would the tip of the median lobe in and of itself be considered a valid way to separate genera in many other groups of Coleoptera.

Stilodes is a large and probably polyphyletic genus, largely South American in distribution. Both it and *Leptinotarsa* are in need of modern taxonomic revisions. For the present, there are no characters or combination of characters that reliably separate these taxa and hence no justification for keeping them as separate genera. Unfortunately for the applied entomological literature and those overly concerned with "taxonomic stability", *Stilodes* Chevrolat 1843 has nomenclatural priority.

Stilodes belti (Jacoby)
Leptinotarsa belti Jacoby **new synonymy**

Stilodes decimlineata (Say)
Leptinotarsa decimlineata Say
new synonymy

Stilodes evanescens (Stål)
Leptinotarsa evanscens Stål
new synonymy

Stilodes flavitarsis (Guerin-Meneville)
Leptinotarsa flavitarsis Guerin-Meneville
new synonymy

Stilodes fuscolineata (Stål)

Stilodes haldemani (Rogers)
Leptinotarsa haldemani Rogers
new synonymy

Stilodes leoparda Jacoby

Stilodes modesta Jacoby

Stilodes motschulkyi Stål

Stilodes neptis (Stål)

Stilodes panamensis Jacoby

Stilodes quadristriata Jacoby

Stilodes undecimlineata (Stål)
Leptinotarsa undecimlineata Stål
new synonymy

Zygogramma Chevrolat 1837

Species in this genus have *Calligrapha* – like markings of white to yellowish white, overlain with dark stripes or irregular blotches.

Seven species have been recorded from Costa Rica and several more unidentified ones are in the INBio material.
Zygogramma bigenera (Stål)
Zygogramma curvatolineata Jacoby
Zygogramma guttulosa (Stål)
Zygogramma picecollis Stål
Zygogramma popa (Stål)
Zygogramma signatipennis (Stål)
*Zygogramma violaceomaculata (*Jacoby)

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RESUMEN

Se presenta claves en español y inglés para los géneros de Chrysomelinae conocidas de Costa Rica. Para cada género, se presenta una lista de especies compiladas de las colecciones de la Universidad de Costa Rica, el Instituto Nacional de Biodiversidad, y la literatura entomológica. El género *Planagetes* Chevrolat 1843 está registrado por primera vez de América Central, y el género *Leptinotarsa* Stål 1858 está sinonomizado con *Stilodes* Chevrolat 1843.

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