

TWO NEW SPECIES OF *PLAGIOMETRIONA* FROM BOLIVIA AND ECUADOR (COLEOPTERA: CHRYSOMELIDAE: CASSIDINAE: CASSIDINI)

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Abstract.— *Plagiometriona centromaculata* sp. nov. from Bolivia: Santa Cruz department and *P. hyalina* sp. nov. from Ecuador: Morona-Santiago and Sucumbíos provinces are described and figured. Both species are associated with *Solanum* species (Solanaceae).



Key words.— Entomology, taxonomy, new species, Coleoptera, Chrysomelidae, Cassidinae, Cassidini, *Plagiometriona*, Bolivia, Ecuador

INTRODUCTION

Plagiometriona Spaeth, 1899 is a large genus containing 84 species distributed from Mexico to northern Argentina with a single species in Cuba (Borowiec and Świętojańska 2012, Sekerka and Windsor unpublished data). Species are mostly found from mid to high elevations (500–4000 m) with the greatest number of species occurring in the Andes. Those species for which we know their biology are associated with one plant family, the Solanaceae (summarized in Borowiec and Świętojańska 2012). Host plants are presently known based on direct feeding observations only for 16 of 84 species and were mostly recorded recently (Windsor *et al.* 1992, Flinte *et al.* 2008, 2010). Additionally we have data for another 10 species which are also exclusively associated with Solanaceae (Windsor and Sekerka, unpublished data). There are a few published records of association with Convolvulaceae (Silva *et al.* 1968) and Boraginaceae (Zayas 1989), however, these records are based on single observations and most likely represent casual visits rather than feeding. The genus was never revised

and its taxonomy is partly complicated as some species groups exhibit great variability in pattern (i.e. Flinte *et al.* 2010). However, Spaeth (1937) proposed a key to the species groups dividing the genus into two subgenera, *Parametriona* Spaeth, 1937 and *Plagiometriona*, on the basis of the shapes of the humeral angles and the pronotum. Later Borowiec (1999) synonymized the two subgenera. The shape and the degree to which the humeral angles protrude anteriorly along the pronotum is a sexually dimorphic character present in males of *Plagiometriona* s.str. (sensu Spaeth 1937) while females frequently have diverging humeral angles. Nevertheless, Spaeth's key is still valid as most characters are sexually constant and not difficult to observe. During field work in Bolivia and Ecuador we found two species representing new taxa. Both belong to the former subgenus, *Plagiometriona* s.str. (sensu Spaeth 1937) having humeral angles in males strongly protruding anterad along the sides of the pronotum and representing members of two groups of Spaeth's system with rather constant elytral pattern. Their descriptions are given below.

MATERIAL AND METHODS

Figures 4–7 and 14 were taken using Leica S8Apo stereomicroscope with Nikon Coolpix 4500. Remaining macro photos (1–3 and 12–13) were taken by a Canon EOS 1Ds Mark III with Canon EF 100mm f/2.8L IS USM lens. All these figures were composed using Helicon software from stacks of 10–20 separate images.

Measurements were taken from photographs using UTHSCSA Image Tool 3.0; only specimens studied by the senior author in situ had been measured, however, these include the smallest and largest individuals in both cases.

All data from collection labels are verbatim; a double vertical bar ‘||’ divides data on different labels and a single vertical bar ‘|’ separates data in different rows. Additional comments and details of label are given in square brackets.

Descriptions are based on comparison with types of similar species and photos of most of them are available at Borowiec and Świątojańska (2012).

Plagiometriona centromaculata sp. nov.

Etymology. The name is derived from Latin ‘centrum’ = center and ‘macula’ = spot after elytral pattern with central black spot on elytral disc.

Diagnosis. The new species belongs to the *amplexa* group (= group 1 of *Plagiometriona* s.str. in Spaeth’s (1937) system) characterized by humeral angles strongly protruding anterad in right angle along pronotum, inner margin of epipleuron not reaching to apex of elytra, the third antennomere two times longer than the second and distinctly longer than first, clypeus slightly longer than wide with mid furrow, and elytra regularly convex without postscutellar tubercle. The group includes nine species, however, only *Plagiometriona phoebe* (Boheman, 1855) has similar pattern – black elytral disc with yellow ring and black central spot. *Plagiometriona phoebe* is widely distributed through northern South America, mainly in Amazon basin and occasionally reaching Andean foothills in southeast Colombia and Ecuador while *P. centromaculata* is restricted to south Bolivian Andean foothills. *Plagiometriona phoebe* differs in having much bigger central spot on elytra which is elongate and extends basally almost to scutellum and laterally to third row of punctures thus the width of the yellow ring equals one elytral interval while *P. centromaculata* has a central circular spot small, extending laterally only to the second row of punctures thus the width of its yellow ring equals two puncture rows. *Plagiometriona phoebe* also differs in pronotum much broader, especially in males (width/length ratio above 2.1) with anterior margin weakly convex, not

protruding anterad like in *P. centromaculata*. *Plagiometriona centromaculata* is also smaller, slimmer and with narrower explanate margin of elytra of 0.8 width of the disc (as wide as or slightly wider than the disc in *P. phoebe*), particularly obvious in males.

Description. Measurements (n = 5): length of body: 6.79–7.91 mm (mean: 7.18 mm), width of body: 6.10–6.79 mm (mean: 6.30 mm), length of pronotum: 2.30–2.57 mm (mean: 2.38 mm), width of pronotum: 4.32–4.71 mm (mean: 4.44 mm), length/width of body ratio: 1.11–1.16 (mean: 1.14), width/length of pronotum ratio: 1.83–1.89 (mean 1.86). Body almost circular, sexual dimorphism distinct. Males circular with stout, strongly protruding and rounded humeral angles and shallow emargination on pronotum near apex of humeral angles (Fig. 1). Females slightly elongate with obtusely angulate and moderately protruding humeral angles and without emargination on pronotum (Fig. 3).

Pronotum yellow with large basal spot covering almost whole disc. Scutellum black. Elytra yellow with black outer ring and central spot. Black ring extends from 4th to 9th rows of punctures laterally, to 8th row of punctures apically and basally to basal margin, around scutellum is deeply emarginated thus scutellum is not a part of it. Ultimate interval yellow. Central spot small, circular with semi-diameter the width of two sutural intervals. Underside uniformly yellow including legs and antennae, only apical antennomere black with yellowish tip. Living specimens pale yellow with black ring and spot and almost transparent explanate margins (Fig. 11).

Pronotum slightly rectangular, with humeral and basal corners broadly rounded, maximum width in anterior corners, and anterior margin regularly inflexed and moderately projecting forward. Disc of pronotum moderately convex, smooth, shiny, impunctate and with shallow but distinct basal impression. Explanate margin broad, subhorizontal, more or less distinctly separated from disc by impressed line, and with honeycomb structure. Anterior margin moderately bent upwards and canaliculate. Whole surface of pronotum impunctate, polished, smooth, shiny and micro-reticulate.

Scutellum triangular, smooth, shiny, and micro-reticulate.

Base of elytra much wider than base of pronotum. Basal margin moderately sinuate and obtusely serrate. Humeral angles broadly rounded and strongly protruding anterad in right angle along pronotal sides and reaching almost to anterior corners of pronotum. Disc regularly convex without impression. Humeral calli normal, not protruding. Punctuation regular, moderately dense, and moderately coarse. Punctures mostly regular in size, partly irregularly distributed in rows with interspaces varying from much narrower than puncture diameter to as wide as puncture diameter.



Figures 1–6. *Plagiometriona centromaculata* sp. nov.: (1) male dorsal; (2) male lateral; (3) female dorsal; (4) aedeagus dorsal and lateral; *P. phoebe* (Bhn.): (5) aedeagus dorsal and lateral; *P. hyalina* sp. nov.: (6) aedeagus dorsal and lateral.

Punctures gradually coarser laterally. Intervals narrow, 0.5–4.0 times wider than puncture diameter and gradually narrowing laterally. Scutellar row distinct, long, stretching from base of scutellum to the top of elytra. Submarginal row distinct in whole length, its punctures approximately twice coarser than those in remaining rows. Marginal row distinct in whole length, without distinct vacancy, its punctures as coarse as punctures on the disc and less coarse than punctures in submarginal row (Fig. 2). Explanate margin broad, subhorizontal, and with honeycomb structure. Whole surface of elytra smooth and shiny, disc polished, explanate margin micro-reticulate. Apex of elytral epipleura bare.

Eyes large, occupy almost whole sides of head, gena very short. Clypeal lines very fine, visible only as basal rudiments. Clypeus 1.2 times longer than wide, slightly convex, smooth, impunctate, and micro-reticulate with shallow medial furrow. Labrum transverse, broad, and moderately emarginate to $\frac{1}{5}$ length, not carinate. Antennae long, filiform, with six basal glabrous and five terminal dull segments. Length ratio of antennomeres: 100:57:66:66:69:62:76:79:81:80:133. Third antennomere 1.2 times longer than second and subequal in length to fourth. Ninth and tenth antennomeres subequal in length (Fig. 7).

Prosternal collar normal, slightly impressed on sides. Prosternal process moderately broad, moderately constricted around midlength, and strongly expanding apically. Intercostal part with deep elongate sulcus, apex rhomboidal and slightly convex. Whole prosternal

structure sparsely pubescent and micro-reticulate (Fig. 7).

Legs normal, not modified. Claws divergent, all appendiculate with moderate tooth and micro-pectinate.

Male genitalia. Aedeagus slim, broadly truncate on apex then gradually widening to its third length and then slowly narrowing towards base. Apex in lateral profile slightly bent dorsally, tubus regularly curved (Fig. 4). In comparison with *P. phoebe* the aedeagus is slightly stouter, apex twice broader and distinctly bent dorsally (Fig. 5).

Host plant. Solanaceae: *Solanum* sp. (Figs 8, 9).

Distribution. Bolivia, Santa Cruz department, Ichilo province.

Material examined. Holotype, male, glued: 'BOLIVIA Santa Cruz dpt. | Florida prov. 9.–13.xii.2008 | Refugio los Volcanes | 18°06'S, 63°36'W, 1045 m | D. Windsor, S. Lingafelter & T. Henry lgt. [green, printed, cardboard label]' (deposited at the Natural History Museum, London, United Kingdom); 4 paratypes, glued and 2 in ethanol: same data as in holotype (preserved at the Department of Zoology, Faculty of Science, University of South Bohemia, Czech Republic and working collection of D. Windsor, Panamá City, República de Panamá); 2 paratypes, male and female, pinned: 'BOLIVIA: Prov. Florida | Dept. de Santa Cruz | Refugio los Volcanes | nr. Bermejo, 3,431 ft. [white, printed and cardboard label] | | S-18.10540°/W-63.59807° | Dec. 4/8, 2009 – A. J. Gilbert, | N. J. Smith & J. Aramayo | Bejarano [white, printed and cardboard label]'



Figure 7. *Plagiometriona centromaculata* sp. nov.: (7): head, antennae, prosternum, and fore legs.

(preserved at the Department of Zoology, Faculty of Science, University of South Bohemia, Czech Republic and in the collection of A. J. Gilbert, Sacramento, California, USA); three paratypes, male and two females, glued: 'BOLIVIA Santa Cruz dpt. | Florida prov. 10.–14.xii.2011 | Refugio los Volcanes | 18°06'S, 63°36'W, 1045 m | SOL: *Solanum* sp. | L. Sekerka lgt. [green, printed and cardboard label]' (preserved at the Department of Zoology, Faculty of Science, University of South Bohemia, Czech Republic and Museo de Historia Natural Noel Kempff Mercado,

Santa Cruz de la Sierra, Bolivia). Three larvae (one 5th and the others 3rd instar) collected and conserved in pure ethanol on the same occasion as the holotype are deposited in working collection of D. Windsor, Panamá City, República de Panamá.

Biological notes. Present data indicate the species may be restricted to the foothills of the eastern Bolivian Cordillera at the so-called 'Elbow of the Andes' where the direction of the Cordillera abruptly changes. This area largely coincides with the Amboró National park, one of the most diverse parks in the World, and the



Figures 8–11. *Plagiometriona centromaculata* sp. nov.: (8, 9) host plant *Solanum* sp. (Solanaceae); (10) third instar larva; (11) living specimen on its host plant.

type locality of *P. centromaculata* is near its SE limit. The vegetation of Los Volcanes is lower Yungas forest that can be characterized as humid premontane cloud forest with steep slopes and cliffs, alluvial valleys and deep gorges. Yungas is generally the typical and most diverse habitat in Amboró NP. Specimens of *P. centromaculata* were found on young understorey *Solanum* plants growing along the edges of a small stream situated in deep ravine. Adults in repose under leaves of the host plant (Fig. 11) have nearly the same appearance as preserved specimens with marginal areas of pronotum and elytra highly transparent. Third instar larva has a semicircular, somewhat granular exuvial-fecal shield (Fig. 10) and was feeding on the same plant as adults. Pupa and egg are unknown.

Plagiometriona hyalina sp. nov.

Etymology. The name is derived from Latin 'hyalos' = glass after transparent explanate margin of elytra.

Diagnosis. The new species belongs to the *clarki* group (=group 4 of *Plagiometriona* s.str. in Spaeth's (1937) system) characterized by humeral angles strongly protruding anterad in right angle along pronotum, inner margin of epipleuron not reaching to apex of elytra, the third antennomere as long as or slightly longer than the second, and elytra with postscutellar tubercle. The group comprises four species: *P. clarki* (Boheman, 1862) from Bolivia, Ecuador, and Peru, *P. eggi* Spaeth, 1899 from Peru, *P. rubridorsis* Spaeth, 1912 from Ecuador, and *P. vespertilio* (Spaeth, 1902) from Peru. *Plagiometriona hyalina* differs in uniformly yellow dorsum while all above mentioned have black or brown pattern, spots, or disc uniformly black. Moreover, it has coarse and dense punctation of elytra with punctures nearly touching each other while remaining species of the *clarki* group has punctation of elytra fine and sparse with interspaces many times wider than the puncture diameter. *Plagiometriona hyalina* also has humeral angles broadly and regularly rounded while other species have slightly constricted lateral margin just behind apex thus looks slightly expanded and obtusely acuminate.

Description. Measurements (n = 3): length of body: 7.05–7.52 mm (mean: 7.33 mm), width of body: 6.92–7.31 mm (mean: 7.10 mm), length of pronotum: 2.19–2.26 mm (mean: 2.22 mm), width of pronotum: 4.14–4.28 mm (mean: 4.21 mm), length/width of body ratio: 1.02–1.05 (mean: 1.03), width/length of pronotum ratio: 1.89. Body stout, almost circular (Fig. 12). Discs of pronotum, elytra, and scutellum pale yellow. Explanate margins hyaline, semitransparent. Explanate margin of elytra with shortened and dark yellow humeral spot reaching to $\frac{2}{3}$ of width. Clypeus yellow,

antennae yellow except blackish tip of last segment. Thorax black, abdomen yellow. Coxae infuscate black, remaining parts of legs yellow. Pronotum rectangular, with humeral and basal corners broadly rounded, maximum width in anterior corners, and anterior margin regularly inflexed and moderately projecting forward.

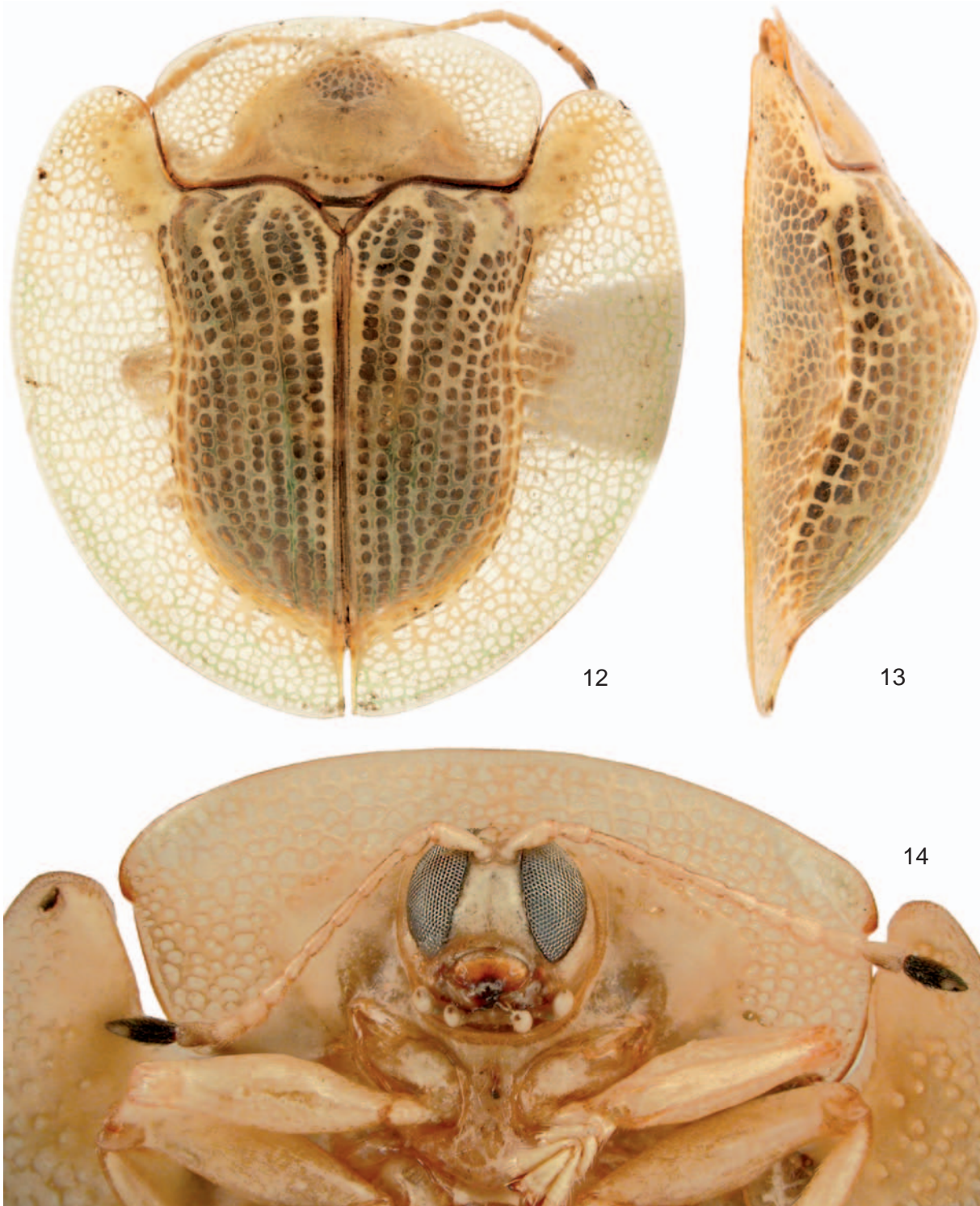
Disc of pronotum moderately convex, without any impression and impunctate, only base with moderate line of several punctures. Explanate margin broad, subhorizontal, more or less distinctly separated from disc by impressed line, and with honeycomb structure. Whole surface of pronotum impunctate, polished, smooth and shiny.

Scutellum triangular, smooth, shiny, and indistinctly micro-reticulate.

Base of elytra much wider than base of pronotum. Basal margin moderately sinuate and obtusely serrate. Humeral angles broadly rounded and strongly protruding anterad in right angle along pronotal sides and reaching almost to anterior corners of pronotum. Disc convex, with moderate postscutellar hump, and moderately deep scutellar impressions. Humeral calli normal, not protruding. Punctation regular, dense, and moderately coarse. Punctures mostly regular in size, regularly and densely distributed in rows with interspaces much narrower than puncture diameter. Punctures gradually coarser laterally. Intervals narrow, 0.5–1.0 times wider than puncture diameter and gradually widening apicolaterally. Scutellar row distinct, long stretching from base of scutellum to postscutellar hump. Submarginal row distinct in whole length, its punctures twice coarser than those in remaining rows. Marginal row distinct in whole length, without distinct vacancy, its punctures as coarse as punctures on the disc and less coarse than punctures in submarginal row. Ultimate interval narrow but still distinctly wider than others (Fig. 13). Explanate margin broad, subhorizontal, and with honeycomb structure. Whole surface of elytra smooth, shiny and polished. Apex of elytral epipleura bare.

Eyes large, occupy almost whole sides of head, gena very short. Clypeal lines fine, visible only as basal rudiments. Clypeus 1.2 times longer than wide, slightly convex, smooth, impunctate, and micro-reticulate. Labrum transverse, broad, and moderately emarginate to $\frac{1}{5}$ length, not carinate. Antennae long, filiform, with six basal glabrous and five terminal dull segments. Length ratio of antennomeres: 100:60:57:67:66:62:69:75:73:79:119. Second antennomere 1.06 and fourth 1.17 times longer than third. Fourth and fifth antennomeres subequal in length (Fig. 14).

Prosternal collar normal, moderately impressed on sides. Prosternal process moderately broad, moderately constricted around midlength, and strongly expanding apically. Intercoxal part with deep elongate sulcus, apex rhomboidal and slightly convex. Whole prosternal



Figures 12–14. *Plagiometriona hyalina* sp. nov.: (12) male dorsal; (13) male lateral; (14): head, antennae, prosternum, and fore legs.



15



16



17

Figures 15–17. *Plagiometriona hyalina* sp. nov.: (15, 16) host plant *Solanum (Cyphomandra)* sp. (Solanaceae); (17) – living specimen on its host plant.

structure sparsely pubescent and partly striate (Fig. 14).

Legs normal, not modified. Claws divergent, all appendiculate with moderate basal tooth.

Male genitalia. Aedeagus slim, apex shallowly emarginate, gradually widening from apex to fifth of its length and then slowly narrowing towards base. Apex in lateral profile sinuate, tubus in apical third straight

and then regularly curved towards base. Dorso-apical part in lateral view with hump (Fig. 6).

Host plant. Solanaceae: *Solanum (Cyphomandra)* sp. (Figs 15, 16).

Distribution. Ecuador: Morona-Santiago and Sucumbíos provinces.

Material examined. Holotype, male, glued: 'ECUADOR_Orellana'¹ | San Rafael Cascadas, 1200 m |

¹ The province is Sucumbíos not Orellana as the locality is situated on left bank of Río Quijos, a border between Sucumbíos and Orellana provinces.

0°6'15.41"S; 77°35'13.5"W, | 13–18 II 2008, D Windsor [white, printed and cardboard label] || 7205 [white, printed and soft label]' (preserved at the Department of Zoology, Faculty of Science, University of South Bohemia, Czech Republic); paratype, male, glued: 'ECUADOR_Orellana | San Rafael Cascadas, 1300 m | 0°6'15.41"S; 77°35'13.5"W, | 20–25 VII 2008, D Windsor [white, printed and cardboard label] || 7488 [white, printed and soft label]' (in working collection of D. Windsor, Panamá City, República de Panamá); paratype, male, pinned: 'ECUADOR: Morona-Santiago, | Macas [printed] 1,300 m. 19.ix. [handwritten] 19[printed]89[handwritten] | M. Cooper [white, printed and cardboard label] || M. Cooper | BMNH{E} | 2004-275 [white, printed and cardboard label]' (preserved at the Natural History Museum, London); paratype, male, pinned: 'Ecuador, Morona- | Santiago, Cord de | Cutucu 6K.e.of Macas | 1,100 m | 2.iv. [handwritten]198 [printed]1[handwritten] | M. Cooper [white, printed and cardboard label] || M. Cooper | BMNH{E} | 2004-275 [white, printed and cardboard label]' (preserved at the Department of Zoology, Faculty of Science, University of South Bohemia, Czech Republic).

Biological notes. *Plagiometriona hyalina* is found in foothills of several lower Cordillera east of the main Cordillera Oriental range. The locality, San Rafael, is situated in the valley of the Río Qujios where the habitat can be characterized as lower montane cloud forest. The other locality, Cordillera del Cutucú, has the same habitat type and together with Volcán Reventador, Volcán Sumaco and Cordillera del Condor these ranges forms the eastern limit of the Ecuadorian Andes and to the east of them a descent into the Amazon basin. Living specimens have a smooth greenish-grey dorsal appearance in repose under leaves of the host plant (Fig. 17). Immature stages of this species were not observed.

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