

## ***Labrundinia separata*: redescription of adults and description of immatures (Diptera: Chironomidae: Tanypodinae)**

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### ***Labrundinia separata*: redescrición de adultos y descripción de inmaduros (Diptera: Chironomidae: Tanypodinae)**

■ **RESUMEN.** Se redesciben e ilustran los adultos macho y hembra, y se describen los inmaduros de *Labrundinia separata* (Edwards). Los ejemplares estudiados fueron colectados como inmaduros en los bosques de *Notophagus* del norte de la Patagonia Argentina y criados, hasta adultos, en laboratorio. Esta especie es comparada con sus congéneres más similares.

**PALABRAS CLAVE.** Chironomidae. Tanypodinae. *Labrundinia separata*. Argentina. Neotrópico.

■ **ABSTRACT.** Adults male and female of *Labrundinia separata* (Edwards), and the immatures are described and illustrated. The studied specimens were collected as immatures in the *Notophagus* forest of northern Argentinean Patagonia, and reared to adult in laboratory. The species is compared with the most similar cogeners.

**KEY WORDS.** Chironomidae. Tanypodinae. *Labrundinia separata*. Argentina. Neotropical region.

### **INTRODUCTION**

The genus *Labrundinia* was erected by Fittkau (1962) with *L. longipalpis* Goetghebuer as the type species. This is a widely distributed Pentaneurini genus, represented by fifteen named species, of which eight occur in the Neotropical region, four in the Nearctic, two jointly in the Neotropical and the Nearctic, and one in the Palaearctic (Ashe & O'Connor, 2009). Roback (1987a) reported twelve unnamed species, of

which ten were cited as Neotropical but their descriptions are incomplete and based on a single larval or pupal specimen. Therefore, it is evident that *Labrundinia* is a diverse genus in the Neotropical Region and further studies on it are necessary.

All named species are known through their male adults. The immatures of the Nearctic and Palearctic species are fully known, as well as the ones of *L. tenata* Roback and *L. pilosella* (Loew) in the Neotropics (Silva & Fonseca-Gessner, 2009).

*Pentaneura separata* was described by Edwards (1931) on the basis of two males and one female collected in Patagonia, and Spies & Reiss (1996) transferred it to *Labrundinia*. Recently we successfully raised this midge from the pupa collected in Río Negro province, Argentina, and could also find the larva. The male and female adults are herein redescribed, and the first descriptions of pupa and larva are provided.

## MATERIAL AND METHODS

Structural descriptions and measurements are taken from specimens slide-mounted in Canada balsam. Measurements are in  $\mu\text{m}$  and given as ranges followed by those of the holotype or allotype in square brackets. The terminology and abbreviations for general morphology follow Sæther (1980), and those for the larval cephalic setation are adopted from Kowalyk (1985).

The type material of *L. separata* is deposited at the Natural History Museum, London (BMNH), and the material collected recently is housed in the Museo de La Plata, Buenos Aires (MLP).

## RESULTS

### *Labrundinia separata* (Edwards, 1931)

*Pentaneura separata* Edwards 1931: 252, fig 37c.

*Labrundinia separata*: Spies & Reiss 1996: 81 (species catalog from Neotropics and Mexico); Donato *et al.* 2008: 165 (chironomid checklist from Nahuel Huapi National Park); Ashe & O'Connor 2009: 166 (a world catalog of Chironomidae).

**Type material.** Holotype male (BMNH), ARGENTINA: Río Negro province, Lago Nahuel Huapi, "Eastern end", 28-31.x.1926, leg. F.W. Edwards. Allotype female (BMNH), CHILE: Chiloé province, Ancud, 17-19.xii.1926, leg. F.W. Edwards.

**Other material examined.** ARGENTINA: Río Negro province, Puerto Blest,

PNNH, Mallín La Heladera, 41°00'56''S, 71°49'54''W, altitude 856 m, 1 male and 2 females, 15.xii.2006, leg. Garré & Montes de Oca, adult net; 2 males, as previous except 7.i.-4.ii.2007, Malaise trap; Río Negro province, Puerto Blest, PNNH, Cántaros lake, 41°00'34''S, 71°49'06''W, altitude 856 m, 5 males and 3 females, 11.i.2007, leg. Garré & Montes de Oca, adult net; Río Negro province, Puerto Blest, PNNH, Mallín La Heladera, 41°00'05''S, 71°50'53''W, altitude 855 m, 1 male and 1 female with its pupal exuviae, 6 pupal exuviae, 1 prepupa and 1 fourth instar larvae, 11.ii.2009 (adults emerged 12.ii.2009), leg. A. Siri, kick sample.

**Diagnostic characters.** *Labrundinia separata* is distinguished from other *Labrundinia* by the following combination of characters: male with abdominal segment I pale brown; II-IV almost brown but with a posterior clear band; V-VIII brown; hypopygium brown. Pupa with more or less globose thoracic horn, with convex anterior margin and "s" curved posterior margin; short apical nipple; tube of aeropile slightly curved; preapical groove slightly developed or indistinct. Larva with pustules on cephalic head and without maculation; ventral spur group present; lateral spur group absent or indistinct.

### Redescription of imagines

**Male** (n = 7-10, except when otherwise stated in parentheses). (Figs. 1-8)

Total length 2.83-3.45 [3.45] mm; total length / wing length 1.41-1.62 [1.62].

Coloration: Head dark brown, antenna and palpus pale brown. Thorax brown, with dark stripes; scutellum pale brown. Abdomen (Fig. 1): tergite I pale brown, tergites II-IV pale brown each with broad dark apical band, tergites V-IX and hypopygial gonocoxite entirely dark brown. Wing without any marking; macrotrichia homogeneously distributed; vein  $R_{2+3}$  faint, only distinguishable in mounted specimens with loss of macrotrichia. Legs pale brown.

Head (Fig. 2): AR 1.04-1.35 [1.35].

**TABLE I.** Lengths ( $\mu\text{m}$ ) and proportions of male legs of *Labrundinia separata* ( $n = 8-10$ , except when otherwise stated in parentheses); values of holotype in brackets.

	fe	ti	ta <sub>1</sub>	ta <sub>2</sub>	ta <sub>3</sub>
P <sub>1</sub>	550-700 [700]	650-810 [810]	420-550 [550] (3)	270-340 [340] (3)	190-260 [260] (3)
P <sub>2</sub>	700-850 [820]	610-760 [760]	600-770 [770] (2)	315-370 [370] (2)	175 (1)
P <sub>3</sub>	620-790 [790]	870-1110 [1110]	695-900 [900] (2)	220-280 [280] (2)	220-280 [280] (2)
	ta <sub>4</sub>	ta <sub>5</sub>	LR	BV	SV
P <sub>1</sub>	140-150 (2)	90-100 (2)	0.65-0.68 [0.68] (3)	2.35-2.48 (2)	2.74-2.86 (2)
P <sub>2</sub>	115 (1)	90 (1)	0.98-1.01 [1.01] (2)	2.75 (1)	2.18 (1)
P <sub>3</sub>	130-165 [165] (2)	90-120 [120] (2)	0.80-0.81 [0.81] (2)	2.80 (1)	2.14 (1)

**TABLE II.** Lengths ( $\mu\text{m}$ ) and proportions of female legs of *Labrundinia separata* ( $n = 3-7$ , except when otherwise stated in parentheses); values of allotype in brackets.

	fe	ti	ta <sub>1</sub>	ta <sub>2</sub>	ta <sub>3</sub>
P <sub>1</sub>	490-650	545-770	400-490 (2)	260-300 (2)	180-210 (2)
P <sub>2</sub>	660-830 [660]	570-770 [570]	600 (1)	290 (1)	265 (1)
P <sub>3</sub>	610-770 [610]	790-1040 [790]	710 (1)	340 (1)	235 (1)
	ta <sub>4</sub>	ta <sub>5</sub>	LR	BV	SV
P <sub>1</sub>	130-150 (2)	90-100 (2)	0.73-0.75 (2)	2.17-2.22 (2)	2.44-2.59 (2)
P <sub>2</sub>	100 (1)	90 (1)	1.00 (1)	2.55 (1)	2.17 (1)
P <sub>3</sub>	140 (1)	90 (1)	0.90 (1)	2.63 (1)	1.99 (1)

Temporals 13-18 [16], uniserial; postorbitals 4-6 [5], uniserial. Clypeus with 15-24 [21] setae. Tentorium 113-183 [150] long. Lengths of palpomeres 1-5: 25-38 [38], 75-88 [88]; 118-158 [158] (3); 120-165 [165]; 200 (1).

Thorax: Antepnotum with 6-11 [7] (6) lateral setae, and 2 tubercles (Fig. 3). Acrostichals 44-54 (4), biserial, first 5 pairs of them outcurved; dorsocentrals 26-40+ [almost 40] (4), biserial to multiserial anteriorly, biserial posteriorly; prealars 10-18 [18]; supraalars 3-5 [5]; scutellars 19-28 [26].

Wing (Fig. 4): Length 1.72-2.13 [2.13] mm, width 0.46-0.56 [0.56] mm; L/W 3.53-3.88 [3.80]. Vein C not produced beyond R<sub>4+5</sub>; R<sub>2+3</sub> faint; VR 0.65-0.71 [0.66]. Brachiolum with 2-3 [3] distal and 1 proximal setae; squama fringed with 16-21 setae.

Legs: Tibial spur on p<sub>1</sub> 20-23 [23] long (Fig. 5), and on p<sub>2</sub> 23-30 [25] long (Fig. 6); tibial spur and comb absent on p<sub>3</sub>. Lengths and proportions of legs in Table I.

Hypopygium (Fig. 7): Tergite IX convex posteriorly, with 10-18 [11] posterior setae.

Anal point reduced (Fig. 8), and covered by tergite IX, difficult to distinguish in most specimens. Gonocoxite 145-188 [186] long. Gonostylus 102-130 [105] long; HR 1.35-1.66 [1.60], HV 1.69-1.93 [1.88].

**Female** ( $n = 3-7$ , except when otherwise stated in parentheses). Total length 2.45-2.50; total length / wing length 1.24-2.13.

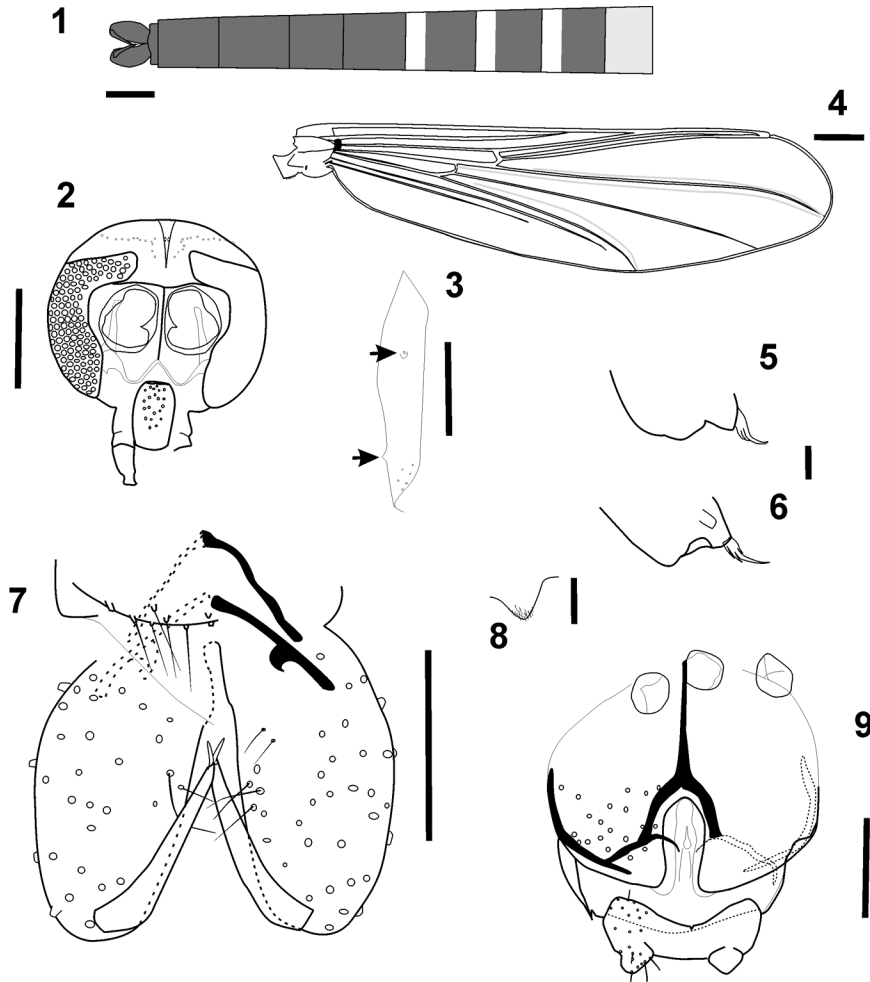
Coloration: Similar to male, except abdomen entirely brown.

Head: AR 0.17-0.20 [0.18]. Temporals 10-15 [10], uniserial; postorbitals 4, uniserial. Clypeus with 18-31 [19] setae. Lengths of palpomeres 1-5: 30-50 [45], 63-75 [63], 108-145 [118], 105-155 (2), 130-150 (2) long.

Thorax: Antepnotum with 3-4 [3] lateral setae, and 2 tubercles. Acrostichals 48-57 [48] in number; dorsocentrals 30-39 [34]; prealars 12-17 [12]; supraalars 2-4 [4]; scutellars 26-31 [31].

Wing: Length 1.15-1.98 [1.55] mm, width 0.55-0.83 [0.55] mm; L/W 2.05-3.00 [2.82]. VR 0.60-0.70 [0.60]. Squama with 14-20 [20] setae.

Legs: Tibial spur on p<sub>1</sub> 20-25 [23] long,



**Figs. 1-9.** *Labrundinia separata* (Edwards), adults. Male: 1, abdominal coloration pattern; 2, head; 3, anteprenotum (arrows indicating anteprenotal tubercles); 4, wing; 5, tibial spur on fore leg; 6, tibial spur on middle leg; 7, hypopygium, dorsal view; 8, reduced anal point. Female: 9, genitalia, ventral view. Scale bars: 20  $\mu\text{m}$  for Figs. 5, 6, 8; 100  $\mu\text{m}$  for Figs. 3, 7, 9; 200  $\mu\text{m}$  for Figs. 1, 2, 4.

on  $p_2$  23-28 [26] long; tibial spur and comb absent on  $p_3$ . Lengths and proportions of legs in Table II.

Genitalia (Fig. 9): Notum 100-143 [118] long; ramus 45-75 [57]; seminal capsule 40-50 [43] long. Sternite VIII with 41-48 setae; segment X with 10-14 setae. Cercus 25-35 [35] long.

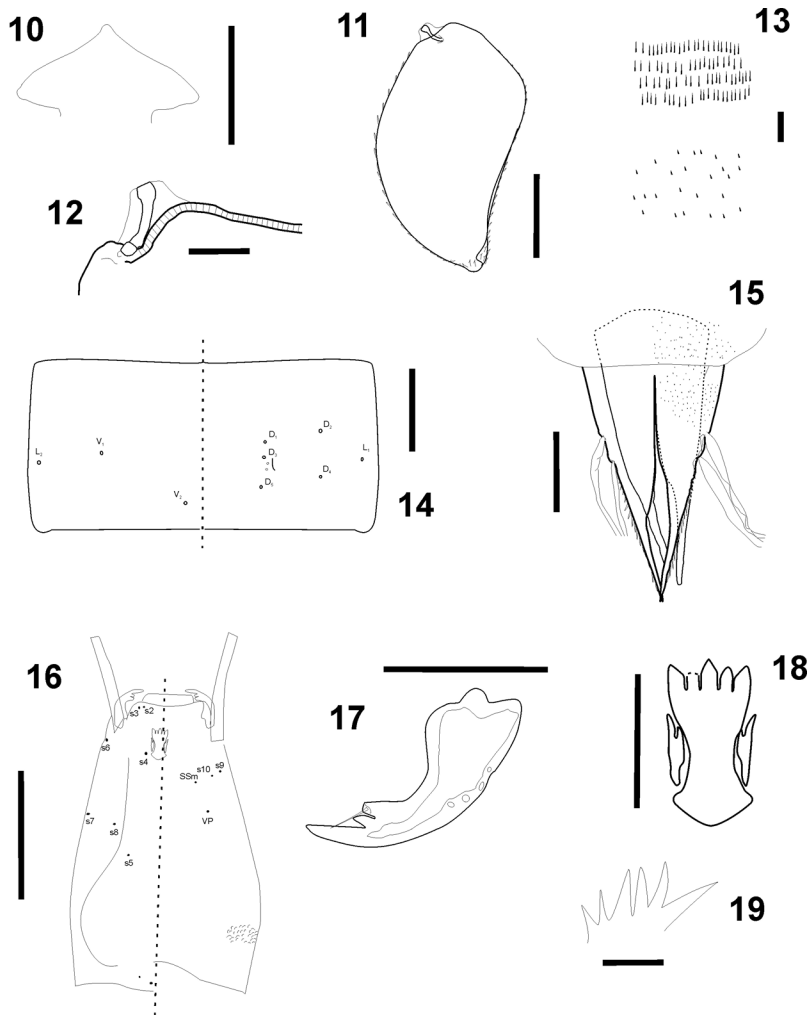
#### Description of immatures

**Pupa** ( $n = 6-8$ , except when otherwise stated in parentheses). (Figs. 10-15)

Total length 3.12-3.56 mm.

Cephalothorax: Frontal apotome as Fig. 10. Thoracic horn more or less globose (Fig. 11), 270-310 long, maximum width 160-190; L/W 1.47-1.88; external membrane covered with numerous spinules; preapical groove short or indistinct; respiratory atrium filling the lumen. Apical nipple 13-20 long, 0.04-0.07 times as long as horn; plastron plate 5 long; neck curved, 25-33 long (Fig. 12). Thoracic comb composed of 9-13 tubercles. All thoracic setae collapsed after mounting.

Abdomen: Scar on segment I present. Shagreen absent on tergite I, dense on tergite II, and sparse on tergites III-IX; spinules 3-5



**Figs. 10-19.** *Labrundinia separata* (Edwards), immatures. Pupa: 10, frontal apotome; 11, thoracic horn; 12, apex of thoracic horn; 13, shagreen on abdominal tergite II (up), and tergite III to anal lobe (down); 14, abdominal segment IV, dorsal view (right) and ventral view (left); 15, anal lobe. Fourth-instar larva: 16, head, dorsal view (left) and ventral view (right); 17, mandible; 18, ligula and paraligula; 19, pecten hypopharyngis. Scale bars: 10  $\mu$ m for Figs. 13, 19; 20  $\mu$ m for Fig. 12; 50  $\mu$ m for Figs. 17, 18; 100  $\mu$ m for Figs. 10, 11, 14, 15; 200  $\mu$ m for Fig. 16.

long, arranged in transverse rows on tergite II, and 1-2 long, arranged solitary on tergites III to anal lobe (Fig. 13). Caudolateral tubercles present on segments II-V. Chaetotaxy (Fig. 14). Dorsal setae  $D_1$ ,  $D_3$  and  $D_5$  mesial, on tergites III-V arranged almost in line (Fig. 14), with  $D_1$  disposed slightly externally.  $D_2$  and  $D_4$  external;  $D_2$  anterior to  $D_1$ ;  $D_4$  between  $D_3$  and  $D_5$ . Ventral setae:  $V_1$  slightly anterior to  $L_2$ ;  $V_2$  caudo-mesial. Segment VII with 4 lateral setae on each side;  $LS_1$ -seta located 0.45-0.50 from anterior margin. Segment

VIII with 5 lateral setae on each side;  $LS_1$ -seta located 0.28-0.30 from anterior margin. Anal lobe (Fig. 15) 330-370 long, 83-100 wide, L/W 3.37-4.20; 11-16 spines present along outer border. Anterior and posterior anal macrosetae located respectively 0.39-0.46 and 0.48-0.54 from anterior margin of anal lobe. Male genital sac 338-355 long, 0.95-0.99 times as long as anal lobe.

**Fourth instar larva** (n = 1-2). (Figs. 16-19) Total length 3.45-4.38 mm.

Head: Length 450-460. Head pustulate (granulose on surface), without dark markings; ventral spur group present, and lateral spur group absent or indistinct. Cephalic ventral seta  $S_{10}$  posteromedial to  $S_9$ , anterolateral to  $SS_m$ , these ventral setae arranged in line; VP posteromedial to  $S_{10}$ , posterolateral to  $SS_m$  (Fig. 16). Dorsal seta  $S_8$  posteromedial to  $S_7$ , anterolateral to  $S_5$ ; DP absent. First to fourth antennal segments 175-188, 80, 6, 4 long; AR 1.89-2.14. First segment with ring organ located 0.77 from base; blade damaged, accessory blade 88 long. Second segment with style 10 long. Basal segment of maxillary palp 23-25 long, 1.77-1.92 times as long as basal width, with ring organ located 0.72 from base. Mandible (Fig. 17) 73-75 long, 0.39-0.43 times as long as first antennal segment. Ligula (Fig. 18) 60-63 long; median tooth 1.11-1.14 times as long as outer tooth; inner tooth 0.90-0.92 times as long as outer tooth. Paraligula bifid, 25-28 long. Pecten hypopharyngis (Fig. 19) with 6 teeth.

Abdomen: Procercus 150-155 long, L/W 4.08-5.00, with 7 anal setae. Posterior parapods damaged.

## DISCUSSION

The abdominal coloration pattern is one of the most important characters used to distinguish males of *Labrundinia* (Roback 1971, 1987b). The abdominal pattern of *L. separata* is the most similar to that of *L. tenata* Roback (see Roback, 1987b, figs. 25 and 32; Silva & Fonseca-Gessner, 2009, figs. 11-12 for *L. tenata*). However, the male of *L. tenata* is smaller (wing length 1.00 mm), and the hind leg is armed with a tibial comb consisting of seven spines (Roback 1987b). The abdominal coloration pattern of *L. separata* is also similar to *L. becki* Roback, but segments II-IV of the latter species are completely brown and the hypopygium is pale (Beck & Beck, 1966; Roback, 1971).

The most distinct differences among the species of this genus may be found in the immature forms. The semi-globose shape, the relatively short neck of the plastron plate,

and the indistinct pre-apical groove are characteristic to the pupal thoracic horns of *L. separata* and *L. maculata* Roback. However, the thoracic horn of the latter species is narrower (see Roback, 1987a, figs. 35-45). In addition, the pupae of these species are distinguished by the dorsal setation of the abdominal segment IV ( $D_3$  is clearly external to  $D_1$  in *L. maculata*).

The larva of *L. separata* is similar to that of *L. pilosella* by virtue of the pustulate head without lateral spur groups. However, the head of *L. pilosella* is dark on the posterior 1/4 and lacks the ventral spur group (Roback 1987a, Epler 2001). *Labrundinia maculata* also has a pustulate head, but a faint lateral spur group is present.

The shape of the furcated claw of the posterior parapod is another important character used to distinguish *Labrundinia* species larvae. Unfortunately, the larvae herein described have the furcated claws extremely condensed, and therefore it was not possible to distinguish their shape.

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