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Article *in* Biologia · September 2014

Impact Factor: 0.83 · DOI: 10.2478/s11756-014-0423-3

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Section Zoology
DOI: 10.2478/s11756-014-0423-3

Geographic distributions, host plants and biology of species in the genus *Huequenia* (Coleoptera: Cerambycidae), with new records from Southwestern Argentina

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Abstract: *Araucaria* trees as host plants of the longhorned beetle *Huequenia livida* (Coleoptera: Cerambycidae) in Argentina are reviewed. *Araucaria araucana* is its natural host plant in SW Argentina, but the larvae also developed in dead branches of *A. angustifolia* and *A. bidwillii* (new host plant records), when both plants were kept in the same rearing cage with the natural host plant. *Pinus contorta* var. *murrayana*, also mentioned from Argentina, may be a recently adopted secondary host. A winter and a summer generation of *H. livida* was documented for the first time. *Huequenia livida* exceeds the actual natural distribution of *A. araucana* following the distribution of cultivated *A. araucana* and *Pinus* trees.

Key words: *Araucaria araucana*; stem borer; *Huequenia*; Achrysonini; South America.

Introduction

The longhorned beetle *Compsa livida* Germain, 1898 (Coleoptera: Cerambycidae) was described from Chile. Later it was transferred to the new genus *Xenocompsa* Martins, 1965 (Cerambycinae: Ibidionini) by Martins (1965), and again to the new genus *Angolia* Cerda, 1980 (Cerambycinae: Hesperophanini). A second species in this last genus was described (*Angolia araucana* Cerda, 1980). As *Angolia* Cerda, 1980 was preoccupied by *Angolia* Malloch, 1934 (Diptera), the new name *Huequenia* was proposed by Cerda (1986). *Huequenia* was transferred from Hesperophanini to Achrysonini (Cerambycinae) by Martins (2002), who mentioned both species only from Chile.

Until 2005, the genus *Huequenia* was not mentioned from Argentina (Di Iorio 2005). Turienzo (2005) published the first record for *Huequenia livida* (Coleoptera: Cerambycidae) from Argentina, together with the first known host plant from this country. Larval tunnels and pupal chambers of *H. livida* were described by Turienzo (2006). Villacide et al. (2005, 2006) also recorded *H. livida* from Argentina, but in a different host plant, and Gómez (2008) mentioned three species of *Pinus* as its host plants, without more details.

Araucaria trees are known as host plants of *H. livida* in Argentina. Some works have been made about extant *Araucaria*-insect associations, related to *Araucaria angustifolia* (Bertol.) Kuntze (Pastrana 1950; Mecke et al. 2000a,b, 2001, 2004a, b; Mecke & Galileo 2004), *Araucaria araucana* (Molina) Koch (Hodge 1997; Turienzo 2005, 2006; Ferrer et al. 2007), *Araucaria laubenfelsii* Corbas (Mecke 2004b), *Araucaria muelleri* (Carr.) Brong. *et* Griseb. (Mecke 2004b), *Araucaria cunninghamii* Aiton ex Don (Hawkeswood 1990, 1992), and *Araucaria heterophylla* (Salisb.) Franco (Hawkeswood 1992).

In this paper, a bibliographic review is presented, with corrections and new locality records for species in the genus *Huequenia*, together with emergence data from host plants. It is established here for the first time that *H. livida* is a bivoltine species with two generations per year, one large generation in autumn-winter, and a short one in summer.

Material and methods

Known localities and host plants of *Huequenia* sp. per locality are summarized in order to locate both in the composite map of the geographic distribution of the insect-host plant associations (Fig. 1).

Dead branches of *Araucaria araucana* with signs of infestation by Cerambycidae (Figs 2, 3, 5) were collected at three localities in Neuquén province, Argentina (Supplementary file: Table S1). These dead branches were located in old living trees cultivated inside public squares in urban areas (Figs 2, 3), and they were infested with active larvae or emerging adults inside the pupal chambers. The branches were maintained in rearing cages made of mesh wire at ambient temperature to avoid interference with the natural conditions of emergences in the field.

Dead branches of *Araucaria angustifolia* and *Araucaria bidwillii,* obtained from cultivated trees in the province of Buenos Aires, were kept with *A. araucana* in the same rearing cages in laboratory (Buenos Aires, Ciudad Universitaria). After checking ovipositions in these additional branches, they were later transferred separately to rearing

Fig. 1. Current distributions of *Araucaria araucana* (dark green areas, modified from Echeverría et al. 2004) and *Huequenia livida*: red circles, localities where *H. livida* were reared and/or observed on *A. araucana* (literature data and author's records); light green circle, locality where *H. livida* was recorded on *Pinus contorta* var. *murrayana*; blue circles, localities where specimens of *H. livida* were captured (examined from entomological collections and literature data); Aa-Ab, found on *A. angustifolia* and *A. bidwilli* (Chile: Santiago); black squares, transported specimens.

cages until new adults emerged (Supplementary file: Table S2). Emergences were recorded daily (Supplementary file: Tables S1, S2), with the numbers of specimens emerged in each date in parentheses. Each specimen (Supplementary file: Tables S1, S2) was labelled with locality and date of field collection of the host plant, and a smaller, second label with the host plant and emergence data. Plant names and abbreviations of authors are according to Wiersema & León (1999).

Collections mentioned in literature (not examined)

BTCC, Barriga Tuñón Enrique collection, Curicó, Chile.
CMCC, Cerda Miguel collection, Chile [currently MNHN].
EIIB, Ecología de Insectos, INTA Bariloche, Río Negro, Argentina.
MNHN, Museo Nacional de Historia Natural, Santiago, Chile.
MZSP, Museu de Zoologia, Universidade de São Paulo, São Paulo, Brazil.
PLSC, Peña Luis collection, Santiago, Chile [Cerambycidae currently in MZSP].

Collections examined

DIOC, Di Iorio Osvaldo collection, Buenos Aires, Argentina.
MPFA, Museo Provincial "Florentino Ameghino", Santa Fe, Argentina.
SNSA, Servicio Nacional de Sanidad Animal, Buenos Aires, Argentina.
ZFNE, Zoología Forestal, Universidad Nacional del Comahue, San Martín de los Andes, Neuquén, Argentina.

Results

Subfamily Cerambycinae Latreille, 1804

Achrysonini Lacordaire, 1869

Huequenia araucana (Cerda, 1980)

See historic taxonomy and bibliographic references in Monné (2001: 10) except: *Huequenia araucana*: Martins 2002: 62 [key], 64 [distr.; re-descr.; refs.]

Known geographic distribution

CHILE: Malleco (Cerda 1986): Nahuelbuta National Park, 7-I-1966, M. Cerda leg., 1 male holotype [CMCC], 17 ex. paratypes [CMCC] (Cerda 1980; Martins 2002), 2 ex. paratypes [PLSC] (Cerda 1980); Nahuelbuta, II-1953, L. Peña leg., 1 ♀ [DZUP], I-1966, M. Cerda leg., 2 ♂♂ [DZUP], II-1968, M. Cerda leg., 1 ♀ [DZUP], I-1976, M. Cerda leg., 2 ♂♂ [DZUP], I-1978, M. Cerda leg., 3 ♂♂, 2 ♀♀ [DZUP], XII-1983, M. Cerda leg., 1

♀ [DZUP] (Martins 2002); Caramávida, 10-XI-1956, 3 ♂♂ paratypes [PLSC] (Cerda 1980; Martins 2002); Llonquimay, Galletué, 3-I-1962, L. Peña leg., 2 ♂♂ paratypes [PLSC] (Cerda 1980; Martins 2002); Arauco: Pichinahuel (Cordillera de Nahuelbuta), I-1959, Dirings leg., 3 ♂♂, 1 ♀ [DZUP] (Martins 2002).

Known host plants
Araucaria araucana
CHILE: "it was found only in *Araucaria araucana* where it develops" [translated from Spanish] (Cerda 1980; Martins 2002); Malleco: Nahuelbuta National Park, 37°47′ S, 73°00′ W, 12-II-2005, J.E. Barriga leg., # 169587, 1 ex. [BTCC], "fogging s/ *Araucaria araucana*" [printed label], "*Huequenia* / *araucana* / (Cerda, 1980) / det: JE Barriga" [printed label], extracted from http://www.coleoptera-neotropical.org/paginas/3_familias/CERAMBYCIDAE/chile/ Huequenia-araucana.html (accessed 20.09.2012).

Remarks. According to Martins (2002), *H. araucana* can be characterized by the prothorax without lateral tubercles; the pronotum without smooth areas; the hairless vertex, scape pronotum and elytra; its smaller size (7.4–7.8 mm total length). In contrast, *H. livida* has lateral tubercles in the prothorax; pronotum with a small central area and two smooth gibbosities in front of its half length; the vertex, scape and pronotum finely pubescent; the elytra sparsely pubescent, and its greater size (10.2–13.2 mm total length).

Huequenia livida (Germain, 1898)
See historic taxonomy and bibliographic references in Monné (2001: 10–11) except: *Huequenia livida* (Germain, 1901): Turienzo 2005 [dist; host; ref.]: *erratum pro livida* Germain, 1901 [genus *Sybila*]
Huequenia livida (Germain, 1898): Martins 2002: 62–63 [distr.; hosts]; Turienzo 2006: 655–658 [biol.]; Villacide et al. 2006: 122–125 [distr.; hosts; refs.]; Pacini 2011: 17 [cat.; distr.]; Machado et al. 2012: 187 [host; ref.]

Known geographic distribution (without host plant records)
CHILE: Santiago: Santiago, without date, L. Peña leg., 1 ♂, 2 ♀♀ [MZSP], 18-X-1983, L. Vargas leg., 1 ♂ [MZSP] (Martins 2002); Biobío: locality not stated (Cerda 1986; Martins 2002); Malleco: Galletué [= Laguna de Gualletue], II-1962, Valencia leg., 1 ♂ [MZSP]; Icalma [= Paso de Icalma], 17-I-1962, L. Peña leg., 1 ♀ [MZSP]; Licura (Lonquimay, 1800 m), 6/10-I-1959, M. Cerda leg., 1 ♂, 1 ♀ [MZSP], I-1959, Dirings leg., 2 ♂♂, 1 ♀ [MZSP]; Nahuelbuta [= Parque Nacional Nahuelbuta, 37°48′23″ S, 72°59′35″ W], XI-1936, Bullock leg., 3 ♂♂ [MZSP] (Martins 2002); Cabrería (1100 m) [= Estero Cabrería, 37°49′35″ S, 73°00′49″ W], I-1977, L. Peña leg., 1 ♂ [MZSP]; Pichinahuel [= Cerro Pichinahuel, 37°47′47″ S, 73°01′40″ W], 31-XII-1958, M. Cerda leg., 1 ♀ [MZSP], I-1959, Dirings leg., 1 ♂, 2 ♀♀ [MZSP] (Martins 2002); Valdivia: locality not stated (Cerda 1986; Martins 2002).

Known host plants
Araucaria araucana
CHILE: uble: Agricultural School of Chillán, A. Besoaín leg., in dead trees of an avenue (Porter [1921] 1922a), = Chillán (Durán M. 1963, following Porter [1921] 1922a, 1922b); Malleco: Cordillera de Tolhuaca [type locality], 1 ♂, 1 ♀, beating dry branches (Germain 1898; Cerda 1980), 2 syntypes [MNHN] (Martins 2002); Angol, 30-XI, D.S. Bullock leg., 3 ♂♂ [MZSP], labeled "en *Araucaria imbricata*" (Martins 2002); Cautín: Temuco, R.E. Baquedano leg., pupae inside pupal chambers (Porter [1921] 1922a 1922b), = "cordillera de Cautín" (Durán M. 1963, following Porter [1921] 1922a, b); (Duffy 1960, following Porter 1922a, dated 1923); (Cerda 1980); (Monné 2001); **ARGENTINA**: Neuquén: San Martín de los Andes, 10-I-2005, P. Turienzo & O. Di Iorio leg, in basal dead branches on living trees (Turienzo 2005 2006).

Araucaria angustifolia
CHILE: Metropolitan Region: in dead wood (Barriga et al. 1993); (Martins 2002); Santiago, specimens in MNHN, on dead branches (Villacide et al. 2006); Talagante: Naltagua, I-1993, J.E. Barriga leg., # 40213, 1 ex. [BTCC], "ex / *Araucaria* / *angustifolia* / (muerto)" [printed label], "*Huequenia* / *livida* / (Germain, 1898) / det: J.E. Barriga" [printed label], extracted from http://www.coleoptera-neotropical.org/paginas/3familias/ CERAMBYCIDAE /chile/Huequenia-livida. html (accessed 20-XI-2012).

Araucaria bidwilli
CHILE: Metropolitan Region: in dead wood (Barriga et al. 1993); (Martins 2002); Santiago, specimens in MNHN, on dead branches (Villacide et al. 2006).

Remarks. Barriga et al. (1993) mentioned that *Huequenia araucana* was reared from dead branches of cultivated plants of *Araucaria angustifolia* and *A. bidwilli* from the Metropolitan Region (= Santiago), later compiled by Monné (2001) and Martins (2002). Villacide et al. (2006) mentioned that the specimens deposited in MNHN with this origin and host plants belong to *H. livida*. Thus, there are two possibilities: 1) the identification made by Barriga et al. (1993) is correct, and both *H. araucana* and *H. livida* live in the same host plants in the Metropolitan Region, or 2) *H. livida* is the single species present in the Metropolitan Region, and the record of Barriga et al. (1993) is an error of identification of *H. livida* by *H. araucana*. Accordingly to the second possibility, specimens from Santiago were identified by Martins (2002) as belonging to *H. livida*, and one specimen from the Barriga collection (photo), collected near Santiago and reared from *Araucaria angustifolia*, proved to be *H. livida*. Therefore, both *A. angustifolia* and *A. bidwilli* originally recorded in the Metropolitan Region for *H. araucana* are in reality hosts of *H. livida*.

Figs 2–5. Habitats of *Huequenia livida* outside its natural geographic distribution. 2: Two recently dead basal branches of *A. araucana* infested with larvae in one cultivated tree at one square in San Martín de los Andes (Neuquén, Argentina); 3: Detail of a basal dead branch where remaining subcortical tissues and leaves has begun to fall to the ground (same place as Fig. 2); 4: Dead standing tree in the garden of a house at San Martín de los Andes, infested but not sampled; 5: Forestation of young trees of *A. araucana* mixed with *Pinus contorta* var. *murrayana*, where lopped branches of *A. araucana* (lower portion of the photo) were infested by *H. livida* (15 km NW of San Martín de los Andes).
Fig. 6. Larva of *H. livida* in a thin branch of *A. araucana*, feeding also inside the foliar bases.

***Pinus contorta* Douglas ex. Loudon var. *murrayana* (Balf.) Engelm**
ARGENTINA: Chubut: Lago Puelo, summer 2005, previously infested by *Sirex noctilio* (F.) [Hymenoptera: Siricidae] (Villacide et al. 2005), [specimens not stated], in collections EIIB and MNHN (Villacide et al. 2006), summer 2005, J. Villacide leg., 13 ex. [MPFA] (Pacini 2011); [province and locality not stated], Argentinean Patagonia, found in "pino contorta", previously infested by *Sirex noctilio* (Gómez 2008); (Machado et al. 2012).

Remarks. Specimens examined in MPFA corresponding to this host do not bear host plant labels.

***Pinus ponderosa* Douglas ex Lawson & C. Lawson**
ARGENTINA: [province and locality not stated], Argentinean Patagonia, found in "pino ponderosa", previously infested by *Sirex noctilio* (Gómez 2008).

***Pinus radiata* D. Don.**
ARGENTINA: [province and locality not stated], Argentinean Patagonia, found in "pino radiata", previously infested by *Sirex noctilio* (Gómez 2008).

New locality records of *Huequenia livida*
Specimens examined (adults without host plant records). **CHILE**: Malleco: Pino Hachado, 6/10-I-1959, L.E. Peña leg., 1 ex. [DIOC]; **ARGENTINA**: Capital Federal: Puerto de Buenos Aires, "o / Chile / 4/ 6 / 03" [= origin Chile, printed label], 2 ex. [DIOC], 3 ex. [SNSA]; **Neuquén**: Pino Hachado, M. Gentili leg., 30-I-1974, 1 ex. [DIOC], 19-III-1974, 1 ex. [DIOC]; Dto. Los Lagos, Embalse Alicurá, 27-XI-2006, S. Tiranti leg., 1 ex. [ZFNE].

Remarks. The adults intercepted by the National Service of Animal Health were found in a container coming from Chile with "raulí & pino Oregon wood" in the Buenos Aires port area. "Pino Oregon" is the common name used in the country for *Pseudotsuga menziesii* var. *menziesii* (Mirb.) Franco [Pinaceae]. This last plant was inspected in Villa La Angostura (Neuquén), but no infestations with *H. livida* were found.

New localities and host plant records of *Huequenia livida*

Specimens reared and larval tunnels and/or pupal chambers observed in the field

Araucaria araucana

ARGENTINA: South-western Argentina [unknown locality], 14-IX-1983, J. Farina leg., 1 ex. [DIOC], emerged in Mar del Plata from a feminine cone with one emergence hole in its base; Neuquén: San Martín de los Andes, 10-I-2005, P. Turienzo & O. Di Iorio leg., 78 ex. [DIOC], first winter generation, 19 larvae and 2 pupae [DIOC], fixed 13-III-2005, 18 ex. [DIOC], summer generation, 17 ex. [DIOC], second winter generation (Supplementary file: Table S1), emerged from basal dead branches on one living tree; San Martín de los Andes, 17-I-2007, Turienzo & Di Iorio leg., 36 ex. [DIOC], winter generation, 669 ex. [DIOC], summer generation (Supplementary file: Table S1), emerged from basal dead branches on one living tree (Figs 2, 3); 15 km north-eastern from San Martín de los Andes, 17-I-2007, Turienzo & Di Iorio leg., 7 empty pupal chambers in lopped branches, 2 ex. [DIOC], winter generation (Supplementary file: Table S1), emerged from thin branches lopped from a young tree (Fig. 5); Villa la Angostura, I-2006, old larval tunnels and empty pupal chambers in basal dead branches on one living tree; Municipio de Villa Angostura, Puerto Manzano, 12/13-I-2007, Turienzo & Di Iorio leg., 13 ex. [DIOC], winter generation, 2 ex. [DIOC], summer generation, emerged from basal dead branches on one living tree (Supplementary file: Table S1); Caviahue, 23-XI-2012, P. Turienzo (pers. obs.), larval tunnels and empty pupal chambers in basal dead branches on living trees; Río Negro: Bariloche, 13-VIII-2012, P. Turienzo (pers. obs.), old larval tunnels and empty pupal chambers in basal dead branches on one living tree.

Remarks. The specimen of *Huequenia livida* from Mar del Plata was found inside the Museo Municipal de Ciencias Naturales "Lorenzo Scaglia" (Mar del Plata, Buenos Aires province) some time after the donation of a feminine cone of *Araucaria araucana* from south-western Argentina. One emergence hole in the cone stalk was observed.

Araucaria angustifolia

ARGENTINA: infested II-2005 in laboratory, 3 ex. [DIOC], winter generation, emerged from windfallen thin branches (Supplementary file: Table S2), infested II-2007, 38 ex. [DIOC], summer generation, emerged from a basal dead branch lopped from one living tree (Supplementary file: Table S2).

Araucaria bidwillii

ARGENTINA : infested II-2005 in laboratory, 8 ex. [DIOC], emerged from a basal dead branch lopped from one living tree (without emergence data).

Pinus contorta*var. *murrayana

ARGENTINA: infested II-2007 in laboratory, 38 ex. [DIOC], winter generation, emerged from a lopped dead tree 10 cm diameter (Supplementary file: Table S2).

Biology of *Huequenia livida*

In these dead branches, more than one successive stage can be seen. In the first, when the branch is recently dead, the larvae are feeding between the xylem and the subcortical tissues and leaves, but no emergence holes are seen (Fig. 2, ticker leafed branches). After two generations, and likely two more in the next year, parts of the subcortical tissues and leaves begin to fall (Fig. 3), and finally, the smooth wood of the branches remain on the plant (Fig. 2, thin branches). When larval density is very high, the dry tissues inside the leaf bases are also consumed, but the leaf cuticle remains intact (Fig. 6). The adults emerge by night, and they copulate immediately after emergences. Females oviposit immediately after copula, and they can re-infest the same branches from which they emerge.

Generations per year and emergence periods

Specimens of Cerambycidae originated in a summer generation are always scarce, and not detectable in a separate peak when compared with the high numbers of adults that passed the winter as larvae, emerging in spring and summer (October to January). These specimens that developed during summer are only detectable by the gap produced between the emergences of both winter and summer generations. The following species from Buenos Aires are good examples of this: *Compsocerus violaceus* (White, 1853), 561 ex. emerged between 16-IX-04 and 15-I-05, and 4 ex. emerged between 9-III-05 and 12-III-05; *Paromoeocerus barbicornis* (F. 1792), 20 ex. emerged between 6-X-02 and 17-XII-02, and 5 ex. emerged between 21-I-03 and 27-I-03; 50 ex. emerged between 16-IX-04 and 15-I-05, and 1 ex. emerged 5-III-05; 22 ex. emerged between 1-X-05 and 14-XII-05, and 2 ex. emerged between 9-I-06 and 6-II-06; *Neoclytus ypsilon* Chevrolat, 1862, 189 ex. emerged between 21-X-03 and 9-II-04, and 6 ex. emerged between 1-III-04 and 5-IV-04 (Di Iorio unpublished data).

It can be observed from the emergence data (Tables S1, S2) that *H. livida* has two generations per year. First, a winter generation, that overwinter as larvae and the corresponding adults emerge from October to February, and later, a shorter summer generation whose adults emerge from middle March to the beginning of June (Tables S1, S2).

Discussion

Geographical distribution and dispersal of Huequenia livida

The *Nothofagus* forests of south-western Argentina were intensively prospected, and the insect fauna (especially Cerambycidae) was well known by great collectors in the western areas of Neuquén and Río Negro, i.e., Demetrio Havrylenko, Sergio Schajoskoy and Conrad Naumann Etienne. Nevertheless, *H. livida* was never reported from Argentina (Monrós [1943] 1944; Havrylenko & Winterhalter 1949; Bosq 1953; Naumann Etienne *circa* 1973). Probably this was due that *Araucaria araucana* was not investigated in its original range (Fig. 1).

The more intensive study of the *Araucaria* forests in the Argentinean side was done by Rothkugel (1916), who also mapped the primitive extension of these forests. Among the diseases of some trees in the austral forests, no one stem borer was mentioned for *A. araucana* by Rothkugel (1916) when *H. livida* was already known from Chile (Germain 1898). The second wood borer in rotten wood of *A. araucana* was described by Bosq (1951) from Argentina and Chile [*Acutandra araucana* (Bosq, 1951)].

The oldest known specimen of *H. livida* found in Argentina dates from 1974 in a low pass of the Andean Mountains (Pino Hachado), where *H. livida* was also found in the Chilean side (Fig. 1) much before than in the Argentinean side. Pino Hachado and Caviahue are comprised in the natural distributión of *A. araucana* forests (Fig. 1).

The distribution of *H. livida* is comprised between parallels 35° to 40° S in Chile (Martins 2002), but if this distribution is superimposed with the distribution of *Araucaria araucana* (Fig. 1), it can be seen that *H. livida* appears also outside the distribution of its host plant in both Chile and Argentina (Fig. 1). Therefore, it is possible to think that the presence of *H. livida* outside the natural distribution of *A. araucana* in Argentina and Chile may be the result of a recent dispersal following cultivated *Araucaria* trees (Figs 2–5). In Argentina, it can be also found in areas with forestations of *Pinus* spp. (Villacide et al. 2006). Noteworthy, it is coincident that Porter ([1921] 1922a) and Barriga et al. (1993) also report *H. livida* on cultivated trees of *Araucaria*, these last authors as far as the city of Santiago, Chile (Fig. 1, Aa-Ab).

This situation also occurs in Argentina with other native Cerambycidae species where their native host plants are cultivated out of its natural range (Di Iorio 1993, 1995), or with native Cerambycidae that had expanded their original distributions thanks to the adoption of new exotic larval hosts (Di Iorio 1998; Di Iorio & Farina 2009).

Host plants of species in the genus Huequenia

The mention of *Araucaria araucana* as a native larval host plant of *H. livida* in Chile was done in few localities (Fig. 1). Germain (1898: 116) founds a male and a female of *H. livida* shook dry branches of *A. araucana*. Porter ([1921] 1922a) attributed to this beetle "dried a beautiful avenue of those trees" [translated from Spanish], and also mentions pupae in dry branches of the same host plant, as well as Porter (1922b). According to Peña (1960), *H. livida* "is other of the Cerambycidae species proper from the *Araucaria* Region; it is commonly found in fallen trees, and that had remained in this state by more than three months, being difficult that remains there if these trees are yet maintained by more than six months. It is frequent to found them in couples, because isolated I only saw them flying. I never collected this species with help of the light" [translated from Spanish].

No locality or other details were given by Peña (1960), but Martins (2002) cited only one specimen of *H. araucana* from Nahuelbuta as collected by Luis Peña prior to 1960, while all specimens of *H. livida* were collected by Peña after 1960. Therefore, it will be necessary to examine all possible specimens collected by Peña for to know if Peña (1960) was speaking about *H. livida* or *H. araucana*. Also it is not clear if Cerda (1980) mentions previous records of *H. livida* on *A. araucana* (Germain 1898 is cited among the references), or if he also found and/or reared *H. livida* from this plant in one or in all localities, as well as for *H. araucana*.

The new observations made here does not agree with the observations of Porter ([1921] 1922a) because the death trees that he mentioned likely die by other factors, and not by *Huequenia* and then, *H. livida* appears developing on them. Barriga et al. (1993) also give *H. livida* as developing on dead wood in Chile (8a. Region). As this beetle develops in basal dead branches that naturally occur in living trees (Figs 2, 3) or in lopped branches (Fig. 5), it can't be considered of economic importance or an insect injurious to their host plants.

As the trees of *A. araucana* are cultivated out of its natural distribution, they may be exposed to some stress occasioned by the different environment. Therefore, it is not strange to observe some trees in gardens (Fig. 4) or public squares that die without apparent reason, which are after infested by *H. livida*.

The near phylogenetic relationship between *A. araucana*, *A. angustifolia* and *A. bidwillii* (Setoguchi et al. 1998) could explain the insect chosen of their hosts in laboratory. The actual distribution of these three species presents a barrier to the dispersion of this insect in their natural environment.

Villacide et al. (2006) record *Pinus contorta* var. *murrayana* (referred as "*Pinus murrayana*") from Chubut (Lago Puelo) as a host. Later, Gómez (2008) mentioned *H. livida* on three species of *Pinus* from the Argentinean Patagonia, but the province, locality, specimens emerged and repositories were not stated. According to Stefanovic et al. (1998), Pinaceae and Araucariaceae are not phylogenetically related. Nevertheless, the presence of *H. livida* in *Pinus* (Villacide et al. 2005, 2006) is confirmed here (Supplementary file: Table S2), a secondary likely recently adopted new host plant.

All species of *Pinus* cited by Villacide et al. (2005 2006) and Gómez (2008) were previously infested by *Sirex noctilio*. This exotic wasp infests living plants that die by the inoculation of the fungus *Amylostereum areolatum* (Fr.) during the oviposition (Vizcarra Sánchez 2004). In contrast, *H. livida* infests dead and/or recently dead plants, making use of the available dead wood in the environment. The *Pinus* infested by *H. livida* in laboratory was not previously infested by *S. noctilio*, showing that this condition is not indispensable. Recent observations in Caviahue show emergence holes in *A. araucana* identical in size and shape to the emergence holes of *Sirex noctilio* in *Pinus*, showing that likely*S. noctilio* was able to adopt a new host in the inverse way to *H. livida*. Further observations of this respect are urgently needed.

Acknowledgements

The authors are grateful to UBACYT, Proyect X 828 (to O. Di Iorio) for financial support of this study; Wolf Engels whose comments improved the manuscript in the first version; Norma Cardador & Ricardo Fantini (Villa La Angostura), Andrea Medina & Sergio Tiranti (San Martín de los Andes), Betty López & Francisco Romero (Cavihaue) for the support in the respective places; Sergio Tiranti also for his field assistance; Parques Nacionales for allow us to take the dead branches in the Lanín National Park.

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Received December 10, 2012
Accepted August 2, 2014