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Insects found in birds' nests from Argentina: *Coryphistera alaudina* Burmeister, 1860 (Aves: Furnariidae), their inquiline birds and mammals, new hosts for *Psammolestes coreodes* Bergroth, 1911 and *Triatoma platensis* Neiva, 1913 (Hemiptera: Reduviidae: Triatominae)

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Abstract

The insect fauna in nests of *Coryphistera alaudina* Burmeister, 1860 (Aves: Furnariidae) were studied in the provinces of Santiago del Estero, Chaco, Córdoba, and La Pampa in Argentina. A total of 7364 insect specimens comprising 77 taxa in a total of 29 families and 7 orders was found in their nests: 40 identified to species, 23 identified to genus, and 14 identified to family. *Coryphistera alaudina* and some of their vertebrate inquilines are new host records for the triatomine bugs *Psammolestes coreodes* Bergroth, 1911 and/or *Triatoma platensis* Neiva, 1913 (Hemiptera: Reduviidae). The insects in the nests of *C. alaudina* are separated by functional guilds, and their permanence time inside the nests are presented in a new manner and discussed.

Key words: stick nests, kissing bugs, southern South America

Introducción

Coryphistera alaudina Burmeister, 1860 (Aves: Furnariidae) is distributed in southeastern Bolivia, southwestern Brazil, west of Paraguay (Paraguayan Chaco), through the center of Argentina, and west of Uruguay (Vaurie 1980, Areta & Bodrati 2007). In Argentina, it is distributed from the north (Formosa, south of Salta and Jujuy) through the south of Mendoza, La Pampa, and the extreme south of Buenos Aires (Fig. 1).

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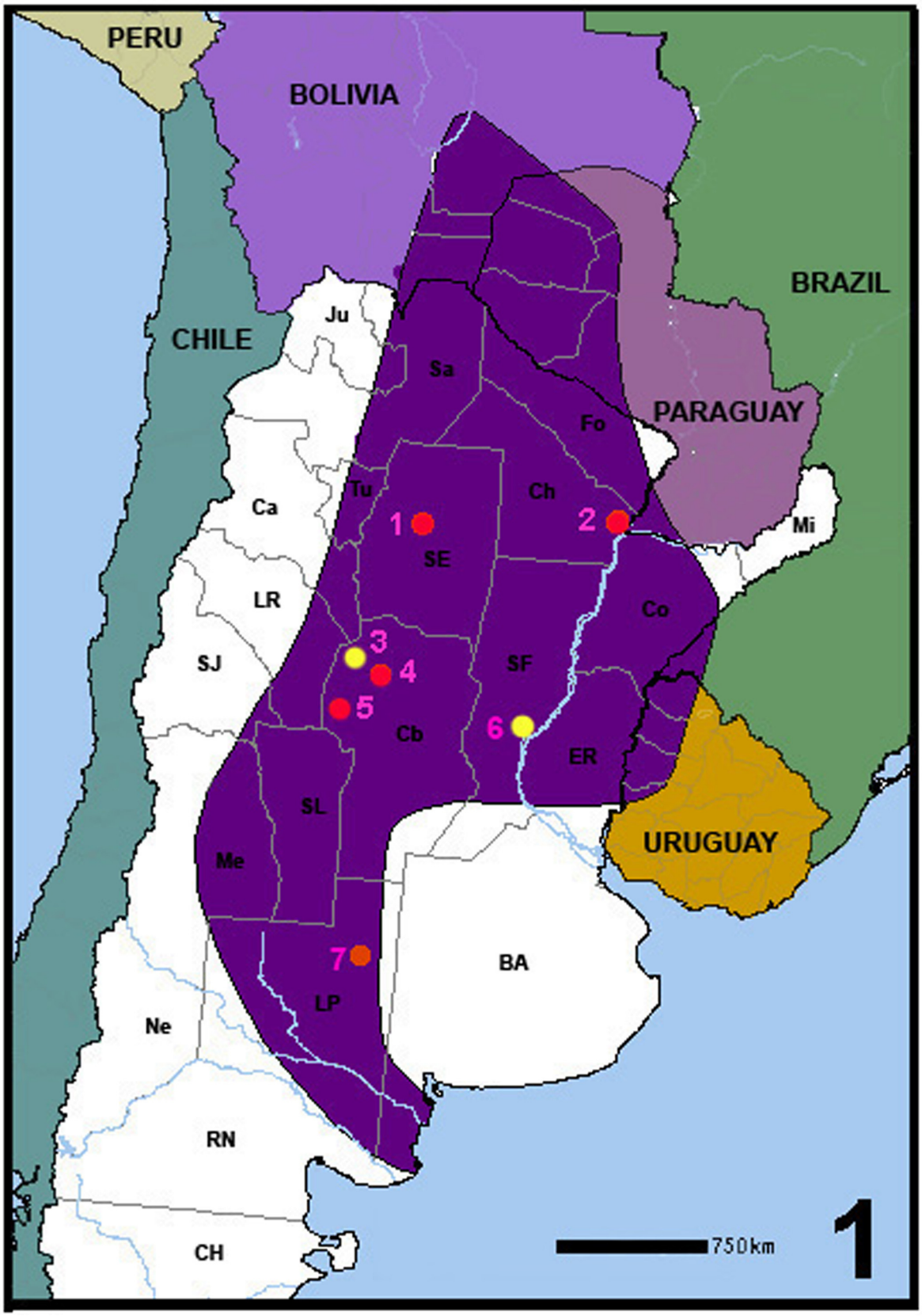

FIGURE 1. Distribution of *Coryphistera alaudina* in Brazil, Bolivia, Paraguay, and Argentina (modified from InfoNatura 2005). Red circles, localities with sampled nests; yellow circles, localities with insects mentioned in the literature. 1, "La María"; 2, Ruta 90, km 21; 3, Guanaco Muerto; 4, Huerta Grande; 5, Mina Clavero; 6, Reserva de la Escuela Granja, Universidad Nacional del Litoral (31º 23'S, 60º 55'W); 7, Santa Rosa.

This species has a complex social behavior in the building of their nests. Each nest is built in approximately one day by a reproductive couple with between two and four helpers with different roles (Areta & Bodrati 2007). Furthermore, more than a couple lay eggs in the same nest in some occasions (Narosky *et al*. 1983); and the nests are also used as dormitories (autoinquilinism) by a bonded pair together with its parents (Appendix 1).

The nests of *C. alaudina* are globular or ovate-shaped, made with thorny sticks, whose entrance (10 cm diameter) is on the superior side directed upwards (Figs. 2–5). From the entrance a vertical tunnel of 25 cm long with a terminal bent is communicated to the breeding chamber, lined with soft vegetal materials and dung (Narosky *et al*. 1983, De la Peña 2005, Areta & Bodrati 2007).

Phylogenetically, *C. alaudina* always appeared as the sister species of *Anumbius annumbi* (Vieillot, 1817) (Irestedt *et al.* 2006, Olson *et al.* 2013). The nests of both birds are very similar in size and aspect, but they have two remarkable differences. First, in the nests of *C. alaudina*, the entrance is located on the superior side, oriented upwards (Figs. 3–4), whereas in the nest of *A. annumbi* also superior but located laterally (although this difference is not clearly visible in some nests). Second, *C. alaudina* always intercalates a thick layer of dung between the floor of sticks and the breeding bed of soft vegetal materials, whereas in *A. annumbi* there is a single but thick layer of vegetal materials forming the bed.

Like other stick nests of Furnariidae and Psittacidae, the nests of *C. alaudina* were also used by a number of vertebrate inquilines: nine species of birds, and unidentified species of rodents (Appendix 1).

Insects in nests of *Coryphistera alaudina*

Very few insects have been mentioned in the nests of *C. alaudina* from Argentina: 1) undetermined species of *Philornis* [Diptera: Muscidae] in Chaco and Córdoba (Salvador 2013, Salvador & Bodrati 2013); 2) *Philornis torquans* Nielsen, 1913 in Santa Fe (De la Peña *et al.* 2003), later mentioned as *Philornis* sp. (Antoniazzi *et al.* 2006) (see also Di Iorio & Turienzo 2011b); 3) *Triatoma infestans* Klug in Meigen, 1834 in two nests (one adult in each); and 4) unidentified nymphs of Triatominae (Hemiptera: Reduviidae) in three nests (including one of the nests with one adult of *T. infestans*) in Córdoba: Guanaco Muerto (Di Iorio & Turienzo 2011b) (Fig. 1).

Egg-traps of *Triatoma infestans* were located inside diverse birds' nests for detection of the egg-parasite *Telenomus fariai* Costa Lima, 1927 (Hymenoptera: Scelionidae). This parasite wasp appeared in six nests with egg-traps from a total of 11 tested nests of *C. alaudina*, including the four nests in which specimens of Triatominae were present (Brewer *et al.* 1978, Di Iorio & Turienzo 2011b).

Triatoma platensis Neiva, 1913 (Hemiptera: Reduviidae) was mentioned in nests of *C. alaudina* from Córdoba: Guanaco Muerto (Brewer *et al.* 1978), a record omitted by Di Iorio & Turienzo (2011b). This omission was probably because in the work of Brewer *et al.* (1978), *T. platensis* was included in a table (without number) inserted in the text at the beginning of the results, but in the Table 4, when the Triatominae in the nests and the results with the egg-traps were detailed, *T. platensis* is not mentioned. The data included by Di Iorio & Turienzo (2011b) were extracted from this last table.

Apparently specimens of *Philornis torquans* reared from *Coryphistera alaudina* from Santa Fe (De la Peña *et al.* 2003) were not sent to M. Couri for identification (Couri *et al*. 2009): for *P. torquans* was reared in the same locality on other Furnariidae (De la Peña *et al.* 2003), but also *Philornis seguyi* García, 1952 (= *P. torquans*, *not* Nielsen, 1913: De la Peña *et al.* 2003) on *Certhiaxis cinnamomea russeola* (Vieillot, 1817) [Aves: Furnariidae] (Couri *et al*. 2009); therefore identification of *P. torquans* given by De la Peña *et al*. (2003) for *C. alaudina* needs further corroboration.

Material and methods

Thirty-eight nests of *C. alaudina* (Figs. 2–5) were sampled in the provinces of Santiago del Estero (12 nests), Chaco (eight nests), Córdoba (14 nests), and La Pampa (four nests) (Fig. 1; Appendix 2). The nests from Santiago del Estero were kindly provided by Eduardo Martín (Fundación e Instituto Mihuel Lillo, Tucumán, Argentina). Measurements of the nests are given in cm (L, length; h, high; w, width) (Appendix 2). The thick layer of dung below the beds of *C. alaudina* was always clearly visible in all sampled nests. The methods were previously described by Turienzo & Di Iorio (2008, 2011). The species of insects in different groups according to their permanent time inside birds' nests are presented here in a new manner after tabulation of the times in which each species was found inside birds' nests, and the instars present in the nests (Table 1).

TABLE 1. Permanence time of the insects inside the nests of *Coryphistera alaudina* from Argentina.AUT, autumn; WIN, Winter; SPR, Spring; SUM, Summer. Letter e preceding the season names indicates early seasons. Violet, entire lyfe cycle inside the nests (permanent and/or temporal inhabitants); light blue, only adults found in the nest during most part of the year, not found and/or rarely outside the nests; green, hibernation (temporal inhabitants); orange, aseasonal quiescence (temporal inhabitants); yellow, accidental and/or ocasional; without color, uncertain status. Letters between parentheses after seasons: e, eggs; L, larvae; n, nymphs; a, adults; without letters between parentheses after seasons are all adults.

Insect species	**Seasons**					
Undetermined sp. (Stratiomyidae)	late SUM (L)	AUT (L)	WIN (L)		late SPR (L)	SUM (L)
Phobelius crenatus	late SUM (a)		WIN (A)	e SPR	late SPR (L, A)	SUM (L, A)
Megatoma ? sp. (sp. 7)	late SUM (L)				late SPR (A)	SUM (A)
Metallactus sp.	late SUM (Lc)					SUM (Lc)
Psammolestes coreodes	late SUM (n, A)				late SPR (n, A)	SUM (n, A)
Triatoma platensis	late SUM (n, A)					SUM (n, A)
Trogoderma sp. 1	late SUM (L)	AUT (L)				SUM (L, A)
Trogoderma sp. 6	late SUM (L)					SUM (L, A)
Trogoderma sp. 8			WIN (L)	e SPR (L)	late SPR (L, A)	SUM (L, A)
Undet. gen., undet. sp. (Dermestidae)			WIN (L)	e SPR (L)		
Saprinus sp.	late SUM	AUT	WIN	e SPR	late SPR	SUM
Undetermined sp. (Anobiidae)	late SUM	AUT	WIN		late SPR	SUM
Ctenomyophila striata	late SUM	AUT	WIN		late SPR	SUM
Undetermined sp. (Aphodiidae)	late SUM				late SPR	SUM
Undetermined sp. (Scenopinidae)	late SUM (L)				late SPR (L)	
Epitragus sp.	late SUM	AUT	WIN	e SPR	late SPR	SUM
Myssipus variabilis	late SUM	AUT	WIN	e SPR	late SPR	SUM
Cycloneda ancoralis	late SUM	AUT		e SPR	late SPR	SUM
Lema bilineata	late SUM	AUT	WIN	e SPR		SUM
Chinavia musiva	late SUM	AUT	WIN	e SPR		
Camponotus sp.	late SUM	AUT				SUM
Stenadalia nordenskjoldi	late SUM	AUT				
Heteroderes rufangulus	late SUM			e SPR		SUM
Lobopoda breyeri	late SUM			e SPR		
Scutobruchus sp.	late SUM			e SPR		
Undetermined sp. (Grylloidea)	late SUM				late SPR	
Dromius negrei	late SUM				late SPR	SUM
Undetermined sp. (Ptinidae)	late SUM				late SPR	SUM
Alphitobius diaperinus	late SUM					SUM
Tropicoptinus bruchi	late SUM					SUM
Strongilium sp.	late SUM					SUM
Cycloneda livida	late SUM					
Crematogaster sp.	late SUM					
Eucheyla (*Inna*) *megala*	late SUM					
Mimodromius sp.	late SUM					
Omalodes marseuli	late SUM					

.....continued on the next page

TABLE 1. (Continued)

Insect species	Seasons
Periplaneta fuliginosa	late SUM
Taphropiestes plaumanni	late SUM
Tenebrionini undetermined	late SUM
Undetermined sp. 35 (Curculionidae)	late SUM
Menetypus platensis	AUT WIN e SPR SUM
Undetermined sp. 4 (Elateridae)	AUT SUM
Hiperaspis sp. 1	AUT
Hiperaspis sp. 2	AUT
Euchistos longipes	WIN
Galgupha sp.	
Harmostes prolixus	WIN
Macrocephalus tuberosus	WIN
Undetermined sp. (Eumenidae)	WIN
Cycloneda sicardi	WIN e SPR
Cycloneda fulvipennis	WIN e SPR
Corizus pictipes	WIN e SPR
Botanochara octoplagiata	WIN e SPR
Botanochara duocecimverrucata	WIN e SPR late SPR
Camponotus mus	WIN SUM
Solanophila paenulata	e SPR
Stator sp.	e SPR
Polistes cavapyta	e SPR
Undetermined sp. 3 (Tachinidae)	e SPR
Coeliodes bruchi	e SPR late SPR SUM
Mimodromius rugosus	e SPR late SPR SUM
Undetermined sp. 14 (Curculionidae)	late SPR SUM
Aeolus sp. 1	late SPR SUM
Alleculla sp.	late SPR SUM
Zacryptocerus sp.	late SPR
Undetermined sp. (Blattaria)	late SPR
Undet. sp. (Acanthocinini)	late SPR
Selenophorus mendicus	late SPR
Pseudomyrmex sp.	late SPR
Polistes carnifex	late SPR
Camponotus rufipes	late SPR
Olbia caprina	late SPR
Blaptica dubia	SUM
Conoderus pseudoscalaris	SUM
Undetermined sp. (Pyralidae)	SUM (L)

FIGURES 2–4. General aspects of the nests of *Coryphistera alaudina*: 2, general view in autumn (Mina Clavero); 3–4, details of the entrance in the superior side, directed upwards (3, Santa Rosa; 4, Huerta Grande); **FIGURE 5.** Nidification of the ant *Camponotus rufipes* inside a nest of *C. alaudina* (Route 90, km 21).

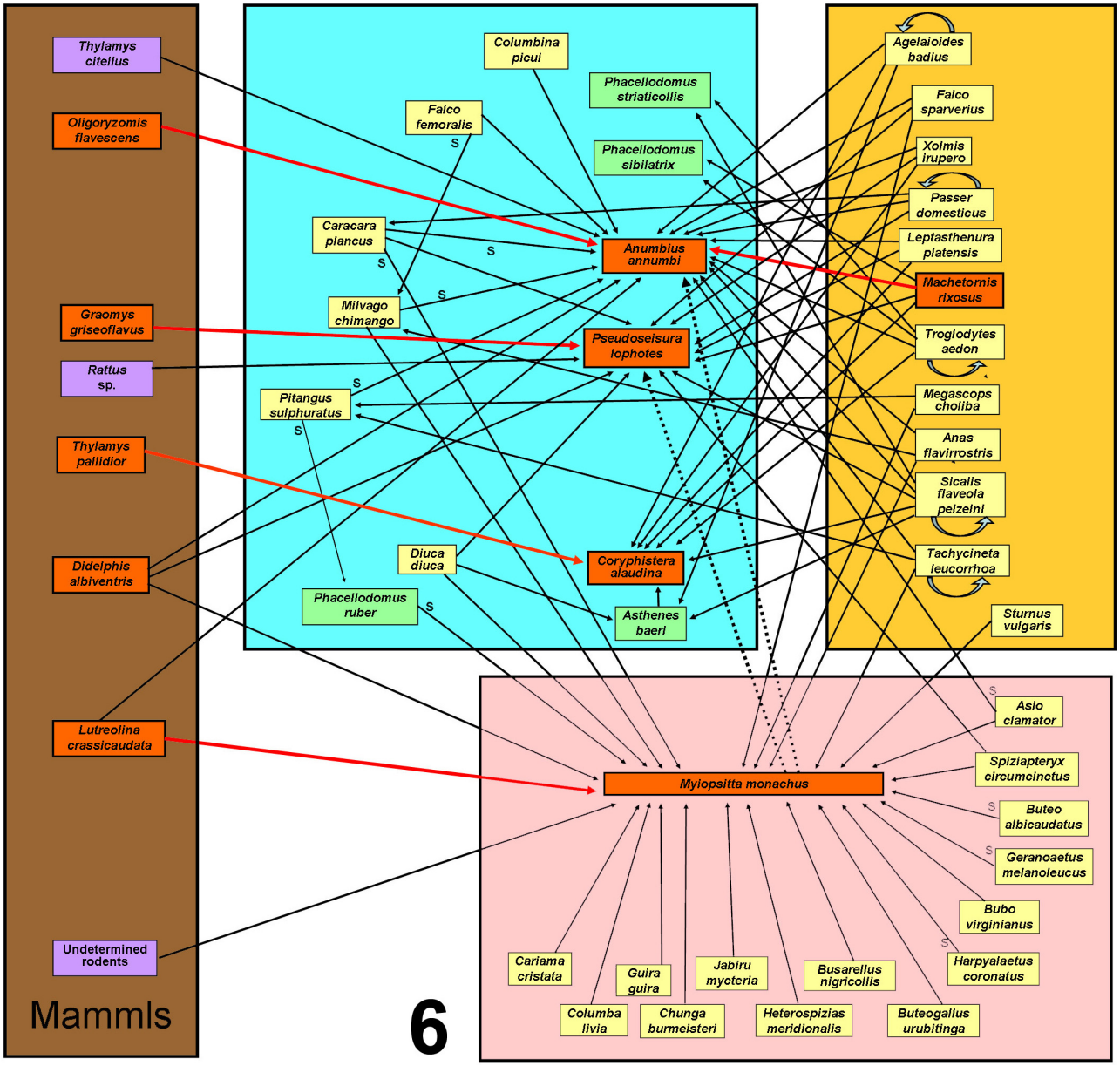

FIGURE 6. Hosts of *Triatoma platensis* in relation to the nests of *Coryphistera alaudina* and other Furnariidae birds, *Myiopsitta monachus* (Psittacidae), and their bird and mammal inquilines. Color inside frames of names: pale yellow, bird inquilines; violet, mammal inquilines: pale green, primary builders; orange, hosts of *Triatoma platensis*. Arrows: thin black, inquilines in the nests; thick red, inquilines found together with *T. platensis*, also recorded as hosts; curved arrows, intraspecific brood parasitism; S, superimposed nests.

Part of the materials was identified by Diego Carpintero (Museo Argentino de Ciencias Naturales, Buenos Aires) [Hemiptera, except Reduviidae: Triatominae], Armando Cicchino (Universidad Nacional de Mar del Plata, Buenos Aires [Coleoptera: Carabidae], and David Flores (Museo Argentino de Ciencias Naturales, Buenos Aires) [inquiline mammals]. All insects and some inquiline specimens (Appendix 2) were deposited in the collection of the second author (DIOC).

Abbreviations of Argentinean provinces used in figures, tables, and appendices.

BA, Buenos Aires; **Ca**, Catamarca; **Cb**, Córdoba; **Ch**, Chaco; **CH**, Chubut; **Co**, Corrientes; **ER**, Entre Ríos; **Fo**, Formosa; **Ju**, Jujuy; **LP**, La Pampa; **LR**, La Rioja; **Me**, Mendoza; **Mi**, Misiones; **Ne**, Neuquén; **RN**, Río Negro; **Sa**, Salta; **SF**, Santa Fe; **SE**, Santiago del Estero; **SL**, San Luis; **SJ**, San Juan; **Tu**, Tucumán.

I. Systematic account of the insects found in nests of *Coryphisytera alaudina* from Argentina

A total of 7364 insect specimens comprising 77 taxa (40 identified to species, 23 identified to genus, and 14 identified to family) in a total of 29 families and 7 orders (Tables 1–2; Appendix 3) was found in the nests of *Coryphisytera alaudina* from Argentina as follows: **COLEOPTERA**: **Anobiidae** [Undetermined sp.]; **Aphodiidae** [Undetermined sp.]; **Carabidae** [*Dromius negrei* Mateu, 1973; *Eucheyla* (*Inna*) *megala* (Reichardt, 1966); *Mimodromius rugosus* Mateu, 1955; *Mimodromius* sp.; *Selenophorus mendicus* Putzeys, 1878]; **Cavognathidae** [*Taphropiestes plaumanni* Slipinski & Tomaszewska, 2010]; **Chrysomelidae**: **Bruchinae** [*Scutobruchus* sp.; *Stator* sp.]; **Cassidinae** [*Botanochara duocecimverrucata* (Boheman, 1850); *Botanochara octoplagiata* (Klug, 1829)]; **Clytrinae** [*Metallactus* sp.]; **Criocerinae** [*Lema bilineata* Germar, 1824]; **Coccinellidae** [*Cycloneda ancoralis* (Germar, 1824); *Cycloneda fulvipennis* (Mulsant, 1850); *Cycloneda livida* Weise, 1906; *Cycloneda sicardi* (Bréthes, 1925); *Epilachna paenulata* (Germar, 1824); *Hiperaspis* sp. 1; *Hiperaspis* sp. 2; *Stenadalia nordenskjoldi* Weise, 1926]; **Curculionidae** [*Coeliodes bruchi* Hustache, 1927 (sp. 5); *Ctenomyophila striata* Hustache, 1927 (sp. 12); Undetermined sp. 14; *Pandeleteius platensis* (Bréthes, 1911) (sp. 19); Undetermined sp. 35]; **Dermestidae** [*Dermestes peruvianus* Castelnau, 1840; *Megatoma* sp.; *Trogoderma* sp. 1; *Trogoderma* sp. 6; *Trogoderma* sp. 8; Undet. genus, undet. sp. (larvae, adults)]; **Elateridae** [*Aeolus* sp. 1; *Conoderus pseudoscalaris* (Schwarz, 1896); *Heteroderes rufangulus* (Gyllenhall, 1817); Undetermined sp. 4]; **Histeridae** [*Omalodes marseuli* Schmidt, 1889; *Saprinus* sp.]; **Ptinidae** [*Tropicoptinus bruchi* (Pic, 1905); Undetermined sp.]; **Tenebrionidae** [*Alleculla* sp.; *Alphitobius diaperinus* (Panzer, 1797); *Epitragus* sp.; *Lobopoda breyeri* Bréthes, 1910; *Phobelius crenatus* Blanchard, 1842; *Strongilium* sp.; Tenebrionini sp.]; **DIPTERA**: **Fannidae** [*Fannia* sp.]; **Muscidae** [*Philornis* sp.]; **Scenopinidae** [Undetermined sp. (larvae)]; **Stratiomyidae** [Undetermined sp.]; **Tachinidae** [Undetermined sp. 3]; **HYMENOPTERA**: **Formicidae** [*Camponotus mus* Roger, 1863; *Camponotus rufipes* (Fabricius, 1775); *Camponotus* sp. (prob. more than one species); *Crematogaster* sp.; *Pseudomyrmex* sp.; *Zacryptocerus* sp.]; **Vespidae** [*Polistes carnifex* (Fabricius, 1775); *Polistes cavapyta* Saussure, 1853]; **LEPIDOPTERA**: **Pyralidae** [Undetermined sp.]; **ORTHOPTERA**: **Grylloidea** [Undetermined sp.]; **BLATTARIA**: **Blaberidae** [*Blaptica dubia* (Audinet-Serville, 1839)]; **Blattidae** [*Periplaneta fuliginosa* (Serville, 1839); Undetermined sp.]; **HETEROPTERA**: **Cydnidae** [*Galgupha* sp.]; **Pentatomidae** [*Chinavia musiva* (Berg, 1878); *Euchistos longipes* (Berg, 1891); *Olbia caprina* Stål, 1862]; **Reduviidae**: **Phymatinae** [*Macrocephalus tuberosus* (Westwood, 1843)]; **Triatominae** [*Psammolestes coreodes* Bergroth, 1911; *Triatoma platensis* Neiva, 1913; *Triatoma* sp. (eggs)]; **Rhopalidae** [*Corizus pictipes* Stål, 1862; *Harmostes prolixus* Stål, 1860]; **Scutelleridae** [*Myssipus variabilis* (Spinola, 1852)].

II. Functional guilds of the insects in nests of *Coryphistera alaudina*

Group 1. Predators

COLEOPTERA: **Carabidae** [*Dromius negrei*; *Eucheyla* (*Inna*) *megala*; *Mimodromius rugosus*; *Mimodromius* sp.; *Selenophorus mendicus*]; **Coccinellidae** [*Cycloneda ancoralis*; *Cycloneda fulvipennis*; *Cycloneda livida*; *Cycloneda sicardi*; *Hiperaspis* sp. 1; *Hiperaspis* sp. 2; *Stenadalia nordenskjoldi*]; **Histeridae** [*Omalodes marseuli*; *Saprinus* sp.]; **DIPTERA**: **Scenopinidae** [Undetermined sp. (larvae)]; **HYMENOPTERA**: **Eumenidae** [Undetermined sp.]; **Formicidae** [*Camponotus mus*; *Camponotus rufipes*; *Camponotus* sp.; *Crematogaster* sp.; *Pseudomyrmex* sp.; *Zacryptocerus* sp.]; **Vespidae** [*Polistes carnifex*; *Polistes cavapyta*]; **HETEROPTERA**: **Reduviidae**: **Phymatinae** [*Macrocephalus tuberosus*].

Inna megala was described from Paraguay: Villarrica [type-locality]: Amambay (Reichardt 1966), without no data on biology. The species of the subgenus *Inna* Putzeys, 1863 are known to "live on tree boles. Proper of lowlands, in tropical wet and decidous forests. Nocturnal, probably depredator. Six species in América (with two subspecies) exist" (Martínez 2005). As was stated for other species of Carabidae found in birds' nests (Turienzo & Di Iorio 2008), "it is not possible to say if the species [of *Dromius* and *Mimodromius*] are exclusive inhabitants of the nests, and they live under bark as an extension, or if they are subcorticolous insects and the nests are an extension."

A noteworthy point is that *Polistes carnifex* is mentioned in Argentina only from Misiones (Willink 1951; Richards 1978; Carpenter 1996). This species is one of the most common wasps in the province of Chaco, known by one of the authors (ODI) for more than 30 years ago, commonly named "calabazan." Its occurrence in the nests

is considered here as accidental and/oroccasional (Table 1), for no paper nests were seen as inquilines inside birds' nests as in other wasps (Turienzo & Di Iorio 2008 2010, 2011, 2014).

The phymatine reduvid bug *Macrocephalus tuberosus* was first cited from Argentina (Misiones; Chaco) by Kormilev (1951). Therefore, the province of Córdoba is a new record, far 850 km southwest from Chaco (Resistencia), and the first citation in a bird nest.

Group 2. Hematophages and parasitoids

DIPTERA: **Muscidae** [*Philornis* sp.]; **Tachinidae** [Undetermined sp. 3]; **HYMENOPTERA**: **HETEROPTERA**: **Reduviidae**: **Triatominae** [*Psammolestes coreodes*; *Triatoma platensis*; *Triatoma* sp. (eggs)].

As was mentioned above, only *Triatoma infestans* and unidentified nymphs of Triatominae were previously found in nests of *C. alaudina* from Córdoba (Di Iorio & Turienzo 2011b), with some doubts concerning the record of *T. platensis*. Therefore, *Psammolestes coreodes* in Santiago del Estero, and *Triatoma platensis* in Santiago del Estero, Chaco, and Córdoba are new records for the nests of *C. alaudina* (Appendix 3), and this bird is a new host record for both triatomine bugs. As the nests are used by *C. alaudina* as dormitories all year round (Appendix 1), both triatomines have available food throughout.

From a total of 64 nests in which *P. coreodes* was found between 1936 and 1979, 12 were referred as "Dendrocolaptidae" (from Salta, Chaco, and Santa Fe), two as Psittacidae (Chaco, Santa Fe), one as *M. monachus* (Salta), 36 as "bird nest" (one from Bolivia, and the rest from Jujuy, Salta, Tucumán, Santiago del Estero, and Chaco), one as a "stick nest" (Santiago del Estero), 8 as "colgadito" (probably *Phacellodomus*, all from Jujuy), and one as "leñatero" (Jujuy) (Turienzo & Di Iorio 2007). Thus, few bird hosts of *P. coreodes* identified to species are known.

From the total of 38 nests of *C. alaudina* examined here, *P. coreodes* appeared in six (15.7%) nests, and only from Santiago del Estero (Appendix 3). Probably some of the 18 unidentified birds' nests examined from Santiago del Estero by Salvador Mazza (Turienzo & Di Iorio 2007) may belong to *C. alaudina*. *Psammolestes coreodes* is shared between nests of *A. annumbi*, *M. monachus*, *P. lophotes,* and *C. alaudina* (Table 2).

Triatoma platensis was found in 7 (18.4%) from the total of 38 examined nests of *C. alaudina* (Appendix 3). Only one nest from Chaco was inhabited by *C. alaudina* in the incubation period (Appendix 2), an indication that this bird is a host for *T. platensis*. This last constitutes the first reliable record of *C. alaudina* as a new host for *T. platensis* (see in Introduction: "Insects in nests of *Coryphistera alaudina*").

Coincidently, the nests of *C. alaudina* from Córdoba: Mina Clavero (Appendix 3) were located in the same property contiguous to the nests of *Pseudoseisura lophotes* Reichenbach, 1853 [Aves: Furnariidae], where *T. platensis* was also found (Turienzo & Di Iorio 2014). In this place, all nests of *C. alaudina* were generally located at lower altitudes in bushes and/or small trees (Fig. 2; Appendix 2), but the nests of *P. lophotes* were located at higher altitude in *Prosopis* trees (Turienzo & Di Iorio 2014) and some of these last nests were sometimes occupied by *Myiopsitta monachus* (Boddaert, 1783) [Aves: Psittacidae] (Turienzo & Di Iorio 2011).

A noteworthy point is that one nest of *C. alaudina* from Córdoba: Mina Clavero inhabited by *T. platensis* (Appendix 3) was also inhabited by the small opossum *Thylamys pallidior* (Thomas, 1902) [Mammalia: Didelphidae] (Appendix 2). Evidence that *T. platensis* can also feed on mammals (rodents) inhabiting a bird nest was reported by Rosa *et al.* (1997) in Uruguay, but *T. platensis* was also found in other Furnariidae nests also inhabited by rodents and opossums (Turienzo & Di Iorio 2007 2014). Therefore, the small opossum *Thylamys pallidior* may be a new host for *T. platensis* (Fig. 6).

Grupo 3. Detritivores

COLEOPTERA: **Aphodiidae** [Undetermined sp.]; **Cavognathidae** [*Taphropiestes plaumanni*]; **Chrysomelidae**: **Clytrinae** [*Metallactus* sp.]; **Curculionidae** [*Ctenomyophila striata*]; **Dermestidae** [*Dermestes peruvianus*; *Megatoma* sp.; *Trogoderma* sp. 1; *Trogoderma* sp. 6; *Trogoderma* sp. 8; Undetermined larva]; **Ptinidae** [*Tropicoptinus bruchi*; Undetermined sp.]; **Tenebrionidae** [*Alleculla* sp.; *Alphitobius diaperinus*; *Epitragus* sp.; *Lobopoda breyeri*; *Phobelius crenatus*; *Strongilium* sp.; Tenebrionini sp.]; **DIPTERA**: **Fannidae** [*Fannia* sp.];

Stratiomyidae [Undetermined sp.]; **LEPIDOPTERA**: **Pyralidae** [Undetermined sp.]; **BLATTARIA**: **Blaberidae** [*Blaptica dubia*]; **Blattidae** [*Periplaneta fuliginosa*; Undetermined sp.].

Trogoderma sp. 8 is added to the fauna of insects in birds'nests. This species appeared only in Mina Clavero (Córdoba), mostly in nests of *C. alaudina* (Appendix 3), except for one specimen in a nest of *Pseudoseisura lophotes* from the same locality (Turienzo & Di Iorio 2014). Their larvae are indistinguishable at first sight from those of *Trogoderma* sp. 1, a common species in other birds' nests of the country (Turienzo & Di Iorio 2008, 2010, 2011, 2014).

Other undetermined larvae of Dermestidae which does not correspond to any other larvae of Dermestidae in birds' nests, were found in the nests of *C. alaudina* from Mina Clavero (Appendix 3), but the generic identification of the adults was not possible.

Group 4. Phytophages and fungivores

COLEOPTERA: **Anobiidae** [Undetermined sp.]; **Chrysomelidae**: **Bruchinae** [*Scutobruchus* sp.; *Stator* sp.]; **Cassidinae** [*Botanochara duocecimverrucata*; *Botanochara octoplagiata*]; **Criocerinae** [*Lema bilineata*]; **Coccinellidae** [*Epilachna paenulata*]; **Curculionidae** [*Coeliodes bruchi*; Undetermined sp. 14; *Pandeleteius platensis* (sp. 19); Undetermined sp. 35]; **Elateridae** [*Aeolus* sp. 1; *Conoderus pseudoscalaris*; *Heteroderes rufangulus*; Undetermined sp. 4]; **HETEROPTERA**: **Cydnidae** [*Galgupha* sp.]; **Pentatomidae** [*Chinavia musiva*; *Euchistos longipes*; *Olbia caprina*]; **Scutelleridae** [*Myssipus variabilis*].

III. Permanence time of the insects inside birds' nests

The separation of the insects by the permanence time in birds' nests is a difficult task that has many controversial points. This classification was first proposed by Nordberg (1936) in Finland, later modified by Woodroffe (1953) in England, and partially adopted by Turienzo & Di Iorio (2008 and earlier works). The insects are classified in order of their constancy, influence, and fidelity to the birds' nests, but this classification cannot be entirely applied here because more data of the occurrence of the insects in other habitats different than birds' nests are needed. This is also because 1) the insect fauna in closed thorny stick nests of American Furnariidae and Psittacidae is by far the highest in the number of species and specimens than in the single open cup-shaped nests of European birds; 2) the insect fauna in North America and Europe is better known regarding habitats and habits of each species, unlike to the South American fauna; 3) the role of most Neotropical insects in birds' nests are completely unknown, as well as outside birds' nests.

First, true nidicolous insects were considered as those species that accomplished their entire life cycle inside birds' nests; they were never found outside them (except some specimens that may be cases of dispersal), and their development depends exclusively on the birds' nests. Therefore, they can be found in the nests in all instars all year round (larvae, pupae, and adults), but in some of cases, only adults are found in autumn–winter–early spring and their reproduction is accomplished in late spring and summer, e.g., *Phobelius crenatus* (Coleoptera: Tenebrionidae), and some Dermestidae (*Trogoderma*). In other nidicolous insects, immature instars in some birds' nests were always absent, probably because the life cycle may be accomplished in the nests of some bird species, and other bird nests with adults only serve as dispersal points, e.g., *Taphropiestes plaumanni*, whose adults are shared among different birds' nests (Table 2). Their larvae and pupae were found only in the nests of *Furnarius rufus* (Turienzo & Di Iorio 2010). Therefore, although it is a true nidicolous insect, *T. plaumanni* has a restricted temporal occurrence in some birds' nests (Table 1).

To this group of nididocolus insects may belong other species that are found only as larvae and whose adults are not known outside the nests or they are unknown, e.g., Stratiomyidae and Scenopinidae, respectively. The case of the Stratiomyidae was first presented by Di Iorio & Turienzo (2011a), and later discussed by Turienzo & Di Iorio (2014).

Other true nidicolous insects which accomplished their entire life cycle in the nests are temporal inhabitants, restricted to a short period of the year, e.g., the subcutaneous larvae of Muscidae, parasites of the nestlings during the breeding period, Triatominae (Reduviidae). Other insects which also accomplished their entire life cycle in the

nests found all year round in all instars accomplished their life cycles in other suitable habitats, e.g., some species of Dermestidae, Tenebrionidae (*Alphitobius diaperinus*), *Blaptica dubia*, *Graptocleptes bicolor*). These insects are also permanent inhabitants in birds' nests but not true nidicolous insects.

An intermediate position is integrated by insects whose adults are found in birds' nests all year round but the larvae were never found in this habitat: some Carabidae, Curculionidae (*Ctenomyophila striata*), Histeridae (*Saprinus*) (Table 1). Particularly, the predator larvae of Histeridae require a very humid environment, such as the wet bed below water suppliers in poultry houses (Turienzo & Di Iorio unpublished data), but that is not present in the nests.

Much of the insects found in birds' nests used them as a shelter in unfavorable weather conditions. The most known situation occurs during autumn and winter, entering into diapause (hibernation). Diapause in insects is induced by climatic conditions, and it is a long process involving several physiological changes some time before the proper unfavorable season. Therefore, the insects begin to go to protected places for hibernation (birds' nests among them) a time before the unfavorable conditions begin. In the opposite side, the exit from the diapause period also take a certain time because of other physiological changes (Tauber *et al.* 1986).

At the same time, it was observed that the resting period in autumn-winter (hibernation) is extended until the end of October (early spring) in specimens of *Botanochara* from Córdoba that still remain in birds' nests when their host plant *Ipomoea hieronymi* var. *kurtziana* (Convolvulaceae) is beginning to grow (Turienzo & Di Iorio pers. obs.). Therefore, the process of hibernation comprises from the late summer (February, March) through the early spring (September and October).

Also unfavorable weather conditions may be present in Spring and Summer, like high temperatures. Thus some insects enter into aseasonal quiescence as a rapid response that does not require any physiological change (Tauber *et al.* 1986). A better example is the aggregations of *Cycloneda ancoralis* in birds´nests and other protected places during different times of the year. Several times, the same species may be in diapause and in aseasonal quiescence inside birds' nests (Table 1).

Hibernation in some Heteroptera is well known, intensively studied in some pest crops such as the pentatomid bug *Nezara viridula* (see color changes in diapause specimens, a summarization of color polymorphisms and references in Turienzo & Di Iorio 2011). In Heteroptera, "it is known that different member species overwinter in different stages. Thus, in nine out of 38 families included into analysis there are examples each representing one of all three (i.e. egg, nymphal, and adult) overwintering stages (e.g., Veliidae, Corixidae, Aphelocheiridae, Reduviidae, Tingidae, and Pentatomidae). However, within the four better studied infraorders (i.e. Gerromorpha, Nepomorpha, Cimicomorpha, and Pentatomomorpha), the adult stage is the only known overwintering stage for 14 out of 38 analyzed families (e.g., Hebridae, Macroveliidae, Hydrometridae, Belostomatidae, Anthocoridae, Coreidae, Acanthosomatidae, and Cydnidae) and this stage may be considered typical (or dominant) overwintering stage for a few other families (e.g., Gerridae, Naucoridae, Tingidae, and Pentatomidae)" Also "a few species of true bugs are known to have summer diapause, an adaptation that allows survival of the hot and, thus, unfavorable periods in mid-summer, better synchronization of the seasonal cycle with resources and/or maintenance of the univoltinism (e.g. in the scutellerid *Eurygaster integriceps* and the pentatomid *Picromerus bidens*)" (Saulich & Musolin 2007).

Nevertheless, the following coincidences and differences were found regarding the Heteroptera in birds' nests: 1) the adult stage is the only known overwintering stage for Anthocoridae, Coreidae, and Cydnidae (Table 1). All active instars of *Lyctocoris campestris* (Anthocoridae, sometimes considered as Lyctocoridae) were found all year round inside birds' nests (Turienzo & Di Iorio 2008 2011 2014), but strangely this species was not found in the nests of *C. alaudina*; 2) only adults (but never nymphs) of Pentatomidae (Table 1) were found hibernating inside birds´nests (Table 1), or in other protected places such as under bark of trees (Turienzo & Di Iorio 2008), and not the adults "as typical (or dominant) overwintering stage" for Pentatomidae (although this may imply that there are overwintering specific differences in the family); 3) other species of true bugs were also found in birds' nests during summer, probably in estival quiescence, because they were active but not inactive as in estivating insects (Tauber *et al.* 1986), e.g., *Myssipus variabilis* (Table 1).

Acording to these above statements, the period considered for hibernation is late summer (February through 21th March), early autumn (21th March and April), autumn (May to 21th July), winter (21th July to 21th September), and early spring (22th September to the end of October), and for aseasonal quiescence late spring (November through 21th December) and summer (22th December to the end of January) (Table 1).

A final group of insects was considered as accidental and/or occasional because they appeared in low numbers in single nests, and/or in high numbers but they are known in similar high numbers in very diverse places. The better example of these last insects are the ants (Hymenoptera: Formicidae), particularly when the species located their colonies and/or nests in every suitable place above the ground level. This insect group is also problematic: if isolated specimens are found in birds' nests in late spring–summer, they clearly are accidentals because ants run everywhere in search of food sources; but if several adult specimens are found together with larvae and nymphs in winter and summer, they can be they considered as inquilines because adults are active and complete ant nests are found inside birds' nests ?, or can be they considered as accidentals because they can overwinter in other places ? (e.g., *Camponotus bonariensis*, *Camponotus mus*). Some other ants, such as true arboricolus species in the genera *Pseudomyrmex* and *Zacryptocerus* (that nidificate in hollow stems and/or vacated larval tunnels of xylophagous insects), may be considered as accidentals and/or occasionals (Table 1).

When the accidental and/or occasional insects are tabulated per season, it can be seen that they were mostly present in the nests during summer (Table 1). There are two possibilities: 1) if the insects are phytophaguous, such as some Heteroptera, they can stay in the nests in aseasonal quiescence (because their food sources are not obviously present inside birds' nests); 2) if the insects are predators, they may stay in aseasonal quiescence (if their prey are outside the nests), or they are accidentals (if they has a wide range of prey, and some of the prey are also present in birds' nests). Thus, it is difficult to designate each species as accidental and/or occasional (only by the number of specimens), or to the group of insects in aseasonal quiescence (Table 1), taking into account that various of these species are also shared with other birds' nests (Table 2), but also because their biologies are in most cases unknown.

At least, an explanation for some accidental and/or occasional insects in birds' nests that was never previously presented may be caused by the sampling method. When the nests are sampled, some tree branches surrounding the nests are lopped, and finally the branch containing the nest. During these operations, the nests could be contaminated with some insect that was occasionally resting on the leaves of the branches. A good example of this situation may be the single specimen of the pentatomid *Olbia caprina* (Appendix 3), found in late spring (Table 1).

IV. Inquiline insects in the nests of *Coryphistera alaudina*

Although some isolated specimens of *Camponotus rufipes* were found inside some nests of *C. alaudina* (Appendix 3), a particular situation in which *C. rufipes* build their own nest inside a bird nest allows to consider this ant as an inquiline insect.

Camponotus rufipes is a unique species of the genus because its nests are built with very fine particles of vegetal matter, located in the bases of grasses and/or shrubs. Nevertheless, this species can also build arboreal nests with the same materials in places of periodical floods (Kusnezov 1951).

In the area of km 21 of the Route 90 (Chaco), small nests of *C. rufipes* (no larger than the size of an apple) were observed in trees in a floodable part, where no nests were found on the ground. Furthermore, one nest of *C. alaudina* was totally occupied by *C. rufipes* in other floodable part, with all spaces among the sticks of the bird nest filled with the very fine particles of vegetal matter that constitutes its own nest (Fig. 5). With a minor movement of the tree, several hundreds of ants come out to defend its nest, and thus it was not sampled. This nest of *C. rufipes* was larger (of the same size as the nest of *C. alaudina*) than the previous observed arboreal nests.

V. Vertebrate inquilines in the nests of *Coryphistera alaudina*

As was previously stated, nine species of birds and unidentified species of rodents were recorded in the literature as inquilines in the nests of *C. alaudina* (Appendix 1). From the total of 38 nests of *C. alaudina* sampled now (Appendix 2), nine (23.6%) were inhabited by vertebrate inquilines. Among the birds, two nests (5.2%) were occupied by *Machetornis rixosus* (Vieillot, 1819) [Aves: Tyrannidae], and one (2.6%) by *Passer domesticus* (Linnaeus, 1758) [Aves: Passeridae]. Among mammals, five nests (13.1%) were occupied by unidentified rodents (one from Chaco, and four from Córdoba). One nest (2.6%) from Córdoba was occupied by seven small opossums, *Thylamys pallidior*, a new inquiline record, and one nest from this locality were occupied twice, first by *M. rixosus*, and after by rodents (Appendix 2).

Unlike the nests of *Anumbius annumbi* and *Pseudoseisura lophotes*, that can be occupied by *M. monachus* (Turienzo & Di Iorio 2011), no nests of *C. alaudina* were found occupied by this parrot (Appendices 1–2). As was previously discussed, in these occupied nests two exclusive ectoparasites of *M. monachus* were found (Turienzo & Di Iorio 2011 2014).

Very recently, an interesting observation was made in the Paraguayan Chaco that can not be strictly included in the records of vertebrate inquilines (Appendix 2). *Coryphistera alaudina* and *Myiopsitta monachus* were observed simultaneously building the same nest without antagonism. An adult parrot was observed "to repeatedly depart some distance from the beginnings of a bowl-shaped nest platform (approximately 40 x 30 cm) and return with thorny twigs. These were incorporated into the lower part of the construction by the birds. At the same time, at least three individuals of *Coryphistera* were observed collecting sticks from the ground in the area around the nest tree and flying up to the same nest platform on the upper side carrying a stick. On most occasions, birds entered into the nest out of sight of the observer, departing shortly after incorporating the stick into the nest. On two occasions birds were observed incorporating sticks into the outer part of the structure, confirming that they were involved in nest-building. When not actively nest building, both species were observed loafing on or near the nest platform, without apparent antagonism" (Smith & Fretes 2013). As these interactions were observed by only four hours (Smith & Fretes 2013), the final user of the nest was not stated.

Regrettably, as this nest was not revised after the last occupation, one of the two following new records was lost: 1) *Coryphistera alaudina* as a new host record of *Psitticimex uritui* (Hemiptera: Cimicidae) if the final user was *C. alaudina*; 2) *Coryphistera alaudina* as a new records of a nest of Furnariidae occupied by *M. monachus* if the final user was *M. monachus* (see the records of Furnariidae nests occupied by *M. monachus* in Turienzo & Di Iorio 2011).

VI. Insects species shared between *Coryphistera alaudina* and other birds' nests from Argentina

From a total of 77 insects species found in the nests of *C. alaudina*, 63 (81.8%) are shared with nests of other birds from Argentina as follows:

- 17 species (22.0% of the total species in the nests of *C. alaudina*) are shared with *Anumbius annumbi*, *Furnarius rufus*, *Myiopsitta monachus* and *Pseudoseisura lophotes* (Table 2).
- other 19 species (24.6%) are shared with *Anumbius annumbi*, *Myiopsitta monachus* and *Pseudoseisura lophotes* (Table 2).
- other three species (3.8%) are shared with *Anumbius annumbi* and *Pseudoseisura lophotes* (Table 2).
- other seven species (9.0%) are shared with *Myiopsitta monachus* and *Pseudoseisura lophotes* (Table 2).
- other two species (2.5%) are shared with *Furnarius rufus*, *Myiopsitta monachus* and *Pseudoseisura lophotes* (Table 2).
- other two species (2.5%) are shared with *Anumbius annumbi*, *Furnarius rufus*, and *Myiopsitta monachus* (Table 2).
- other three species (3.8%) are shared with *Anumbius annumbi*, and *Myiopsitta monachus* (Table 2).
- other three species (3.8%) are shared only with *Anumbius annumbi* (Table 2).
- other six species (7.7%) are shared only with *Myiopsitta monachus* (Table 2).
- other two species (2.5%) are shared only with *Pseudoseisura lophotes* (Table 2).
- a total of 56 species (72.7%) are shared with *Myiopsitta monachus* (Table 2).
- a total of 50 species (64.9%) are shared with *Pseudoseisura lophotes* (Table 2).
- a total of 47 species (61.0%) are shared with *Anumbius annumbi* (Table 2).
- a total of 21 species (27.2%) are shared with *Furnarius rufus* (Table 2).
- 14 species (18.1%) appeared only in nests of *Coryphistera alaudina* (Table 2).

TABLE 2. Insect species shared among the nests of *Coryphistera alaudina* and other bird nests from Argentina. Aa, *Anumbius annumbi* (Turienzo & Di Iorio 2008); Aa II, *Anumbius annumbi* (Turienzo & Di Iorio 2014); Fr, *Furnarius rufus* (Turienzo & Di Iorio 2010); Mm, *Myiopsitta monachus* (Turienzo & Di Iorio 2011); Pl, *Pseudoseisura lophotes* (Turienzo & Di Iorio 2014); Ca, *Coryphistera alaudina* (present work). e, egg/eggs; eP, emerged pupae; L, larvae; Lc, larval cases; LIT, literature record only.

	Aa	Aa II	Fr	Mm	Pl	Ca	Totals
Cycloneda ancoralis [Col.: Coccinellidae]	9430	17938	2	34000	28260	4977	**94607**
Chinavia musiva [Hem.: Pentatomidae]	5356	3282	29	51177	1309	451	**61604**
Alphitobius diaperinus [Col.: Tenebrionidae]	7	453	251	4578	137	2	**5428**
Phobelius crenatus [Col.: Tenebrionidae]	1136	1288	1	609	218	177	**3429**
Misippus variabilis [Hem.: Scutelleridae]	144	236	1	830	1689	66	**2966**
Heteroderes rufangulus [Col.: Elateridae]	495	1735	75	354	7	2	**2668**
Camponotus mus [Hym.: Formicidae]	33	138	1331	3	886	224	**2615**
Taphropiestes plaumanni [Col.: Cavognathidae]	13	67	991	1	3	1	**1076**
Saprinus sp. [Col.: Histeridae]	169	189	85	300	54	36	**833**
Trogoderma sp. 1 [Col.: Dermestidae]	6	32	385	25	7	272	**727**
Galgupha sp. 1 [Hem.: Cydnidae]	613	57	2	11	18	1	**702**
Blaptica dubia [Blattaria: Blaberidae]		14	13	8	233	1	**269**
Undetermined sp. [Col.: Anobiidae]	26	78	2	12	34	14	**166**
Lobopoda breyeri [Col.: Tenebrionidae]	35	32	30	4	46	4	**151**
Undetermined sp. [Ort.: Grylloidea]	51	65	1	18	7	5	**147**
Dermestes peruvianus [Col.: Dermestidae]		2	49	2	6	12	**71**
Pseudomyrmex sp. [Hym.: Formicidae]	14	29	2	8	1	2	**56**
Botanochara duodecimverrucata [Col.: Chrysomelidae]	36	113		1174	6103	140	**7566**
Lema bilineata [Col.: Chrysomelidae]	787	621		250	995	90	**2743**
Ctenomyophila striata (sp. 12) [Col.: Curculionidae]	39	132		236	30	87	**524**
Crematogaster sp. [Hym.: Formicidae]	4	246		42	12	1	**305**
Psammolestes coreodes [Hem.: Reduviidae]	5	23		21	LIT	216	**265**
Stenadalia nordenskjoldi [Col.: Coccinellidae]		10		37	179	8	**234**
Epilachna paenulata [Col.: Coccinellidae]		2		4	219	2	**227**
Scutobruchus sp. [Col.: Chrysomelidae]	54	2		12	71	88	**227**
Undetermined sp. [Col.: Aphodiidae]		3		102	2	75	**182**
Tropicoptinus bruchi [Col.: Ptinidae]		1		69	90	1	**161**
Undetermined spp. [Blattaria]	75	35		13	4	2	**129**
Pandeleteius platensis (sp. 19) [Col.: Curculionidae]	2	4		2	61	23	**92**
Corizus pictipes [Hem.: Rhopalidae]	27	27		1	20	8	**83**
Epitragus sp. [Col.: Tenebrionidae]	2	2		3	49	27	**83**
Coeliodes bruchi (sp. 5) [Col.: Curculionidae]	2	5		41	25	4	**77**
Triatoma platensis [Hem.: Reduviidae]	8	10		13	17	9	**57**
Dromius negrei [Col.: Carabidae]	8	9		4	12	12	**45**
Zacryptocerus sp. [Hym.: Formicidae]		1		3	4	4	**12**
Metallactus sp. [Col.: Chrysomelidae]		1 Lc		2	5	304 Lc	**7**
Cycloneda fulvipennis [Col.: Coccinellidae]		3			53	2	**58**
Cycloneda sicardi [Col.: Coccinellidae]		1			10	2	**13**

.....continued on the next page

TABLE 2. (Continued)

Allecula sp. 1 [Col.: Tenebrionidae]		4			1	2	**7**
Camponotus sp. [Hym.: Formicidae]			78	358	19	117	**572**
Triatoma infestans [Hem.: Reduviidae]			LIT	LIT	LIT	LIT	**LIT**
Undetermined sp. [Dip.: Stratiomyidae]				187	2072	768 L	**2259**
Botanochara octoplagiata [Col.: Chrysomelidae]				41	259	23	**323**
Hiperaspis sp. 2 [Col.: Coccinellidae]				2	4	11	**17**
Hiperaspis sp. 1 [Col.: Coccinellidae]				1	11	5	**17**
Harmostes prolixus [Hem.: Rhopalidae]				1	12	1	**14**
Undetermined sp. 14 [Col.: Curculionidae]				4	2	1	**7**
Undetermined sp. 4 [Col.: Elateridae]				2	1	2	**5**
Aeolus sp. 1 [Col.: Elateridae]	1	1	11	1		3	**17**
Undetermined sp. (larvae) [Scenopinidae]		17 L	258 L	45 L		9 L	
Selenophorus mendicus [Col.: Carabidae]	19	35		303		18	**375**
Megatoma sp. [Col.: Dermestidae]		59		15		11	**85**
Cycloneda livida [Col.: Coccinellidae]	2	1		1		3	**7**
Trogoderma sp. 6 [Col.: Dermestidae]	4	375				8	**387**
Tenebrionini sp. [Col.: Tenebrionidae]		1				8	**9**
Macrocephalus tuberosus [Hem.: Phymatidae]		3				1	**4**
Polistes cavapyta [Hym.: Vespidae]				25		10	**35**
Undetermined sp. [Col.: Ptinidae]				3		6	**9**
Omalodes marseuli [Col.: Histeridae]				3		2	**5**
Stator sp. [Col.: Chrysomelidae]				3		2	**5**
Mimodromius sp. [Col.: Carabidae]				2		2	**4**
Eucheyla (Inna) megala [Col.: Carabidae]				1		1	**2**
Mimodromius rugosus [Col.: Carabidae]					32	5	**37**
Euchistos longipes [Hem.: Pentatomidae]					4	2	**6**
Trogoderma sp. 8 [Col.: Dermestidae]						46	**46**
Fannia sp. [Dip: Fannidae]						24 eP	**24 eP**
Camponotus rufipes [Hym.: Formicidae]						7	**7**
Polistes carnifex [Hym.: Vespidae]						7	**7**
Triatoma sp. [Hem.: Reduviidae]						4 e	**4 e**
Conoderus pseudoscalaris [Col.: Elateridae]						3	**3**
Undet. gen., undet. sp. [Col.: Dermestidae]						3	**3**
Periplaneta fuliginosa [Blattaria: Blattidae]						2	**2**
Philornis sp. [Dip: Muscidae]						1 eP	**1 eP**
Olbia caprina [Hem.: Pentatomidae]						1	**1**
Strongilium sp. [Col.: Tenebrionidae]						1	**1**
Undetermined sp. 3 [Dip: Tachinidae]						1	**1**
Undetermined sp. 35 [Col.: Curculionidae]						1	**1**
Undetermined sp. [Lep.: Pyralidae]						L	**L**
Total exx. per bird species	**18603**	**27364**	**3339**	**94922**	**43293**	**7364**	**194885**

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References

Antoniazzi, L.R., Manzoli, D.E., Chiossone, J., Bono, M.F. & Beldoménico, P.M. (2006) Estudio de las miasis cavitarias provocadas por *Philornis* spp. ¿Son éstas causa de mortalidad en los pichones de las aves? *In*: *I Jornada Nacional de Ectoparasitología Veterinaria*. Corrientes, September 2006, no pagination.

Areta, J.I. & Bodrati, A. (2007) Historia natural y comportamiento social del crestudo (*Coryphistera alaudina*). *Ornitologia Neotropical*, 18, 209–222.

Belton, W. (1985) Birds of Rio Grande do Sul, Brazil. Part 2. Formicariidae through Corvidae. *Bulletin of the American Museum of Natural History*, 180 (1), 1–242.

Brewer, M., Arguello, N., Delfino, M. & Gorla, D. (1978) Parasitismo natural de *Telenomus fariai* Costa Lima, 1927 (Hymenoptera, Scelionidae) en monte, y presencia de *Proanastatus excavatus* De Santis, 1952 (Hymenoptera, Eupelmidae), parasitoide oófago de Triatominae en el Departamento Cruz del Eje, Córdoba, República Argentina. *Anais da Sociedade entomológica do Brasil*, 10 (2), 175–186.

Canevari, M., Canevari, P., Carrizo, G.R., Harris, G., Rodriguez Mata, J. & Straneck, R.J. (1991) *Nueva Guía de las Aves Argentinas*. *Vol. I. & II.* Fundación Acindar, Buenos Aires, 410 pp & 497 pp.

Carpenter, J.M. (1996) Distributional checklist of species of the genus Polistes (Hymenoptera: Vespidae; Polistinae, Polistini). *American Museum Novitates*, 3188, 1–39.

Couri, M.S., Antoniazzi, L.R., Beldomenico, P. & Quiroga, P. (2009) Argentine *Philornis* Meinert species (Diptera: Muscidae) with synonymic notes. *Zootaxa*, 2261, 55–62.

De la Barrera, J.M. (1959) Catastro de roedores en la investigación de la peste. *In*: Bejarano, J.F.R., Del Ponte, E. & Orfila, R.N. (Eds.), *Primeras Jornadas Entomoepidemiológicas Argentinas*. Buenos Aires. Segunda Parte, pp. 907–912.

De la Peña, M.R. (2005) Reproducción de las aves argentinas (con descripción de pichones). *Monografia LOLA* [Literature of Latin America], (20), 1–846.

De la Peña, M.R., Beldoménico, P.M. & Antoniazzi, L.R. (2003) Pichones de aves parasitados por larvas de *Philornis* sp. (Diptera: Muscidae) en un sector de la provincia biogeográfica del Espinal de Santa Fe, Argentina. *Revista FAVE*, Ciencias Veterinarias, 2, 141–146.

Di Giácomo, A.G. (2005) Aves de la Reserva El Bagual. *In*: Di Giacomo, A.G. & Krapovickas, S.F. (Eds.). *Temas de Naturaleza y Conservación*, 4, 201–465.

Di Iorio, O. & Turienzo, P. (2011a) A preliminary bibliographic survey of the insects found in poultry houses from the Neotropical Region, with remarks on selected taxa shared with native birds' nests. *Zootaxa*, 2858, 1–60.

Di Iorio, O. & Turienzo, P. (2011b) Insects found in birds' nests from the Neotropical Region. Addenda, corrections, and the Subantarctic Region of Argentina and adjacent countries. *Zootaxa*, 2950, 1–108.

Dinelli, L. (1918) Notas biológicas sobre las aves del noroeste de la Rep. Argentina. *El Hornero*, 1 (3), 140–147.

Hartert, E. & Venturi, S. (1909) Notes sur les oiseaux de la République Argentine. *Novitates Zoologicae*, 16, 159–267.

InfoNatura (2005) Birds, mammals, and amphibians of Latin America. Arlington, Virginia: Nature Serve. Web application, Version 4.1. Available from: http://wwwnatureserve.org/infonatura (accessed 17 August 2007)

Irestedt, M., Fjeldså, J. & Ericson, P.G.P. (2006) Evolution of the ovenbird-woodcreeper assemblage (Aves: Furnariidae): major shifts in nest architecture and adaptive radiation. *Journal of Avian Biology*, 37, 260–272. http://dx.doi.org/10.1111/j.2006.0908-8857.03612.x

Kormilev, N.A. (1951) Phymatidae argentines (Hemiptera) con observaciones sobre Phymatidae en general. Revista del Instituto Nacional de Investigación de las Ciencias Naturales, Ciencias Zoológicas, 2, 45–110.

Kusnesov, N. (1951) El género *Camponotus* en la Argentina (Hymenoptera: Formicidae). *Acta Zoológica Lilloana*, 12, 183–251.

Martínez, C. (2005) *Introducción a los escarabajos Carabidae (Coleoptera) de Colombia*. Instituto de Investigación de Recursos Biológicos Alexander von Humboldt (Ed.). Bogotá, Colombia, 546 pp.

Narosky, T. & Salvador, S. (1998) *Nidificación de las aves argentinas (Tyrannidae)*. Asociación Ornitológica del Plata. Buenos Aires, 134 pp.

Narosky, T., Fraga, R. & De la Peña, M. (1983) *Nidificación de las aves argentinas (Dendrocolaptidae y Furnariidae)*. Asociación Ornitológica del Plata. Buenos Aires, 98 pp.

Nordberg, S. (1936) Biologisch-ökologische Untersuchungen über die Vogelnidicolen. *Acta Zoologica Fennica*, 21, 1–168.

Olson, J.I., Irestedt, M., Ericson, P.G.P. & Fjeldså, J. (2013) Phylogeny and classification of the New World suboscines (Aves, Passeriformes). *Zootaxa*, 3613 (1), 1–35. http://dx.doi.org/10.11646/zootaxa.3613.1.1

Reichardt, H. (1966) Revisionary notes on the genera of Eucheilini (Coleoptera, Carabidae). *Psyche*, 10, 8–16. http://dx.doi.org/10.1155/1966/38928
Richards, O.W. (1978) *The social wasps of the Americas, excluding the Vespinae.* British Museum (Natural History), London, 580 pp.
Rosa, R., Basmadjián, Y., González, M. & Salvatella, R. (1997) *Triatoma platensis* Neiva, 1913 (Hemiptera, Triatominae) en el Departamento Artigas y su perfil alimentario. *Revista Médica de Uruguay*, 13, 207–212.
Salvador, S.A. (2012) Reutilización de nidos por aves en el área central de Córdoba, Argentina. *Notulas Faunísticas*, Segunda Serie, (91), 1–9.
Salvador, S.A. (2013) Reproducción de los Furnariidae en el Departamento General San Martín, Córdoba, Argentina. *Historia Natural*, Tercera Serie, 3, 61–85.
Salvador, S.A. & Bodrati, A. (2013) Aves víctimas del parasitismo de moscas del género *Philornis* en Argentina. *Nuestras Aves*, 58, 16–21.
Saulich A.H. & Musolin D.L. (2007) Four seasons: diversity of seasonal adaptations and ecological mechanisms controlling seasonal development in true bugs (Heteroptera) in the temperate climate. *In*: Stekolnikov, A.A. (Ed.), *Adaptive Strategies of Terrestrial Arthropods to Unfavourable Environmental Conditions: A collection of papers in memory of Professor Viktor Petrovich Tyshchenko*. *Proceedings of the Biological Institute of St. Petersburg State University*, 53, 25–106. [in Russian. Expanded 4-page English summary. Available from: www.entomology.bio.spbu.ru/personal/saulich/Saulich.pdf (accessed 23 January 2014)]
Smith, P. & Fretes, A. (2013) Two unrelated species of birds (*Myiopsitta monachus*; Psittacidae and *Coryphistera alaudina*; Furnariidae) simultaneously building the same nest in the Paraguayan Chaco. *Ecología en Bolivia*, 48, 52–56.
Tauber, M.J., Tauber, C.A. & Masaki, S. (1986) *Seasonal adaptation of insects.* Oxford University Press, New York & Oxford, 411 pp.
Turienzo, P. & Di Iorio, O. (2007) Insects found in birds' nests from Argentina. Part I: a bibliographical review, with taxonomical corrections, comments, and a hypothetical mechanism of transmission of cimicid bugs. *Zootaxa*, 1561, 1–52.
Turienzo, P. & Di Iorio, O. (2008) Insects found in birds' nests from Argentina. *Anumbius annumbi* (Vieillot, 1817) [Aves: Furnariidae]. *Zootaxa*, 1871, 1–55.
Turienzo, P. & Di Iorio, O. (2010) Insects found in birds' nests from Argentina. *Furnarius rufus* (Gmelin, 1788) [Aves: Furnariidae] and their inquiline birds, the true hosts of *Acanthocrios furnarii* (Cordero & Vogelsang, 1928) [Hemiptera: Cimicidae]. *Zootaxa*, 2700, 1–112.
Turienzo, P. & Di Iorio, O. (2011) Insects found in birds' nests from Argentina. *Myiopsitta monachus* (Boddaert, 1873) [Aves: Psittacidae], exclusive host of *Psitticimex uritui* (Lent & Abalos, 1946) (Hemiptera: Cimicidae). *Zootaxa*, 3053, 1–58.
Turienzo, P. & Di Iorio, O. (2014) Insects found in birds' nests from Argentina. *Pseudoseisura lophotes* Reichenbach, 1853 and *Anumbius annumbi* (Vieillot, 1817) (Aves: Furnariidae), hosts of *Triatoma platensis* Neiva, 1913 (Hemiptera: Reduviidae: Triatominae). *Zootaxa*, 3766 (1), 1–82. http://dx.doi.org/10.11646/zootaxa.3766.1.1
Vaurie, C. (1980) Taxonomy and geographical distribution of the Furnariidae (Aves, Passeriformes). *Bulletin of the American Museum of Natural History*, 166 (1), 1–357.
Willink, A. (1951) Los véspidos sociales argentinos, con exclusión del género *Mischocyttarus* (Hym., Vespidae). *Acta Zoologica Lilloana*, 10, 105–151.
Woodroffe, G.E. (1953) An ecological study of the insects and mites in the nests of certain birds in Britain. *Bulletin of Entomological Research*, 44, 739–772. http://dx.doi.org/10.1017/s0007485300024706

APPENDIX 1. Vertebrate inquilines in nests of *Coryphistera alaudina* mentioned in literature.

Agelaioides badius [***badius*** (Vieillot, 1819)] [ICT]

ARGENTINA: **Formosa**: Reserva El Bagual (Di Giacomo 2005a); **Córdoba**: central area [localities not stated], 30 nests inside abandoned nests (Salvador 2012); **Santa Fe**: Esperanza, 15-I-1999 [1], 13-III-1999 [1 (ps)] (De la Peña 2005).

Asthenes baeri (Berlespch, 1909) [FUR]

ARGENTINA: **Tucumán**: Tapia, two eggs inside an abandoned nest, Dinelli leg. (Hartert & Venturi 1909).

Coryphistera alaudina Burmeister, 1860 [FUR]

ARGENTINA: [locality not stated], eight individuals sleeping in the same nest (the nests of previous years are re-aconditioned) (Canevari *et al*. 1991); **Chaco**: Parque Nacional Chaco, 1997-2003, four individuals per nest roosting in four nests, five individuals per nest roosting in one nest, six individuals per nest roosting in two nests, seven individuals per nest roosting in four nests, eight individuals per nest roosting in five nests, nine individuals per nest roosting in three nests, ten individuals per nest roosting in two nests, 11 individuals roosting in one nest, 13 four individuals per nest roosting in two nests, 14 individuals nest roosting in one nests, from a total of 25 examined nests; the nests are used all year for roosting (Areta & Bodrati 2007).

Leptasthenura platensis Reichenbach, 1853 [Aves: Furnariidae]

ARGENTINA: **Córdoba**: central area [locality not stated], inside 7 disused nests (Salvador 2012).

Machetornis rixosus [***rixosus*** (Vieillot, 1819] [TYR]

ARGENTINA: **Formosa**: Reserva El Bagual (Di Giacomo 2005a); [**Tucumán ?**] (Dinelli 1918); **Córdoba**: central area [locality not stated], 14 nests inside abandoned nests (Salvador 2012); **Santa Fe**: Esperanza, 17-X-2002 [1], 23-X-2002 [2], 21-I-2003 [1], 31-XII-03 [1] (Narosky & Salvador 1998, De la Peña 2005).

Passer domesticus (Linnaeus, 1758) [Aves: Passeridae]

ARGENTINA: **Córdoba**: central area [localities not stated], 2 nests inside abandoned nests (Salvador 2012).

Sicalis flaveola [***pelzelni*** Sclater, 1872] [EMB]

BRAZIL: **Rio Grande do Sul**: Arroio Quarai-chico, 15-II-1971, "one defended woven stick house against attack of *Coryphistera alaudina*, believed to have been original owner" (Belton 1985).

ARGENTINA: [locality not stated], the recently build nests are usurped, or it occupied desused nests (Canevari *et al*. 1991); **Formosa**: Reserva El Bagual (Di Giacomo 2005a); **Córdoba**: central area [localities not stated], 7 nests inside abandoned nests (Salvador 2012); **Santa Fe**: Universidad Nacional del Litoral, Reserva de la Escuela de Agricultura, Ganadería y Granja, 7 km al N de Esperanza, 1998 [12], 2002 [6] (De la Peña 2003); Esperanza, 12-IX-1998 [1], 21-IX-1998 [2], 26-IX-1998 [2], 29-IX-1998 [1], 3-X-1998 [1], 8-X-1998 [1], 13-X-1998 [1], 17-X-1998 [1], 30-X-1998 [1], 7-XII-1998 [1], 11-XII-1998 [1], 12-XII-1998 [1], 4-I-1999 [1], 7-I-1999 [1], 15-I-1999 [1], 22-I-1999 [3], 14-II-1999 [1], 4-X-2002 [1], 11-X-2002 [1], 17-X-2002 [2], 24-X-2002 [2] (De la Peña 2005).

Troglodytes aedon Vieillot, 1809 [Aves: Troglodytidae]

ARGENTINA: **Córdoba**: central area [locality not stated], 6 nests inside abandoned nests (Salvador 2012).

Undetermined species of rodents [ROD]

[ARGENTINA] (De la Barrera 1959).

Xolmis irupero [***irupero*** (Vieillot, 1823] [TYR]

ARGENTINA: **Formosa**: Reserva El Bagual [1] (Di Giacomo 2005a); **Santa Fe**: Villa Ocampo, 27-XI-1995 [1 (3 pi)] (De la Peña 2005); **Córdoba**: central area [locality not stated], nidificating inside 3 abandoned nests (Salvador 2012).

APPENDIX 2. Localities, data, supports and description of the contents in the nests of *Coryphistera alaudina* from Argentina.

Santiago del Estero

SE # 1b, Ruta 9, km 1108, La María, I-2009, *Prosopis* sp., 40 L x 45 h x 38 w, build XI-2007, 1.70 m high.

SE # 2b, Ruta 9, km 1108, La María, I-2009, *Acacia aroma*, 46 L x 34 h x 28 w, build XII-2008, 1.60 m high.

SE # 1, Ruta 9, km 1108, La María, II-2009, *Ziziphus mistol*, build X-2008, 4.20 m high.

SE # 2, Ruta 9, km 1108, La María, II-2009, *Prosopis* sp., build X-2008, 3.30 m high.

SE # 3, Ruta 9, km 1108, La María, II-2009, *Cercidium praecox*, build I-2008, 4.50 m high.

SE # 4, Ruta 9, km 1108, La María, II-2009, *Prosopis* sp., build X-2008, 3.00 m high.

SE # 5, Ruta 9, km 1108, La María, II-2009, *Prosopis* sp., build X-2008, 4.50 m high.

SE # 6, Ruta 9, km 1108, La María, II-2009, *Geoffroea decorticans*, build X-2008, 3.00 m high.

SE # 7, Ruta 9, km 1108, La María, II-2009, *Acacia praecox*, build X-2008, 2.50 m high.

SE # 8, Ruta 9, km 1108, La María, II-2009, *Geoffroea decorticans*, build X-2008, 2.00 m high.

SE # 9 (=3b), Ruta 9, km 1108, La María, II-2009, *Cercidium praecox*, 38 L x 30 h x 30 w, build 2008, 3.00 m high.

SE # 10 (=4b), Ruta 9, km 1108, La María, II-2009, *Acacia aroma*, 30 L x 49 h x 22 w, build 2008, 3.00 m high.

Chaco

Ch # 1 Ca, Ruta 90, km 21, 3-XII-08 # 1, *Prosopis alba*, inhabited by a rodent, bed of grasses with two lactants.

Ch # 2 Ca, Ruta 90, km 21, 3-XII-08 # 3, *Prosopis alba*, 40 L x 45 h x 40 w, non inhabited.

Ch # 3 Ca, Ruta 90, km 21, 4-XII-08, *Erythrina crista-galli*, non inhabited, with an inquiline bird nest inside.

Ch # 4M Ca, Ruta 90, km 21, 4-XII-08, *Acacia caven*, 34 L x 33 h x 24 w, non inhabited.

Ch # 5M Ca, Ruta 90, km 21, 4-XII-08, *Acacia caven*, 35 L x 29 h x 29 w, non inhabited.

Ch # 6 Ca, Avia Terai, 6-I-09, *Patagonula americana*, inhabited with one egg and two nestlings; sticks 2,000 gr, breeding bed 353 gr.

Córdoba

Cb # 1 Ca, Huerta Grande, 21-I-08, *Ulmus* sp., 28 L x 37 h x 23 a, non inhabited.

Cb # 2 Ca, Huerta Grande, 22-X-08 # 1, *Acacia caven*, 30 L x 34 h x 30 w, non inhabited.

Cb # 3 Ca, Huerta Grande, 22-X-08 # 2, *Acacia caven*, 32 L x 34 h x 25 w, non inhabited.

Cb # 6 Ca, Mina Clavero, 14-VII-09 # 1, *Acacia farnesiana*, 30 L x 40 h x 22 w, old nest, with a nest of *Machetornis rixosus* (two broken eggs) + nest of a rodent, new bed with pod fragments of *A. farnesiana*, and numerous fecal pellets.

Cb # 7 Ca, Mina Clavero, 14-VII-09 # 2, *Acacia farnesiana*, old nest, with a nest of a rodent with pod fragments of *A. farnesiana*.

Cb # 8 Ca, Mina Clavero, 14-VII-09 # 3, *Ulmus* sp., non inhabited, with a nest of *Machetornis rixosus*.

Cb # 9 Ca, Mina Clavero, 23-IX-09 # 1, *Acacia farnesiana*, 35 L x 53 h x 28 w, old nest, with a nest of a rodent, new bed with numerous fecal pellets.

Cb # 10 Ca, Mina Clavero, 23-IX-09 # 2, *Acacia farnesiana*, old nest, with a nest of a rodent and fecal pellets.

Cb # 11 Ca, 3 km W La Falda, 28-X-09 # 1, *Acacia farnesiana*, non inhabited.

Cb # 12 Ca, Mina Clavero, 25-XI-09 # 1, *Prosopis* sp., 26 L x 38 h x 22 w, with a dead nestling of *C. alaudina*.

Cb # 13 Ca, Mina Clavero, 25-XI-09 # 2, *Acacia farnesiana*, non inhabited.

Cb # 14 Ca, Mina Clavero, 22-I-10 # 1, *Acacia farnesiana*, with seven individuals of *Thylamys pallidior* (Thomas, 1902) [Mammalia: Didelphidae] (4 scaped, 3 captured).

Cb # 14 Ca, Mina Clavero, 22-I-10 # 2, *Acacia farnesiana*, non inhabited.

Cb # 16 Ca, Mina Clavero, 22-I-10 # 3, *Acacia farnesiana*, non inhabited.

La Pampa

LP # 1 Ca, Santa Rosa, 7-II-08, *Prosopis caldenia*, 33 L x 30 h x 33 w, non inhabited; with two eggs at 4-XI-07.

LP # 2 Ca, Santa Rosa, 2-III-08, *Prosopis caldenia*, 34 L x 34 h x 30 w, non inhabited; with one uninhabited paper nest of *Polistes buyssoni* [Hymnenoptera: Vespidae] inside the breeding chamber.

LP # 3 Ca, Santa Rosa, 6-V-08, *Prosopis caldenia*, 33 L x 49 h x 27 w, non inhabited.

LP # 4 Ca, Santa Rosa, 23-IV-09, *Prosopis caldenia*, old nest, collapsed, with a nest of *Passer domesticus* [Aves: Passeridae] inside.

APPENDIX 3. Insects found in nests of *Coryphistera alaudina* from Argentina.
eP, emerged pupae; L, larvae; Lc, larval cases; oe, operculated egg; P, pupae. Dead specimens are indicated between square brackets.

Santiago del Estero

	La María I-2009 # 1b	La María I-2009 # 2 b	La María II-2009 # 1	La María II-2009 # 2	La María II-2009 # 3	La María II-2009 # 4	La María II-2009 # 5	**TOTALS per sp.**
COLEOPTERA								
Aphodiidae								
Undetermined sp.	6	8	-	1	-	-	2	**17**
Carabidae								
Dromius negrei	1	-	-	-	1	-	1	**3**
Eucheyla (*Inna*) *megala*	-	-	-	1	-	-	-	**1**
Mimodromius sp.	-	-	-	1	-	-	-	**1**
Coccinellidae								
Cycloneda ancoralis	-	39	-	-	-	-	-	**39**
Curculionidae								
Ctenomyophila striata	1	1	1	2	5	-	5	**15**
Dermestidae								
Larvae								
Long black larvae (sp. 1)	21 L	125 L (*)	-	-	-	2 L	-	**148 L**
Big brown hairy larvae (sp. 6)	1 L	-	-	-	-	-	-	**1 L**
Adults emerged								
Trogoderma sp. 1	18	4	1	-	-	-	-	**23**
Trogoderma sp. 6	1	-	-	-	-	-	-	**1**
Elateridae								
Heteroderes rufangulus	-	-	-	-	-	1	-	**1**
Undetermined sp. 4	1	-	-	-	-	-	-	**1**
Histeridae								
Saprinus sp.	-	2	-	-	-	-	1	**3**
Ptinidae								
Undetermined sp.	-	-	-	-	4	-	-	**4**
Tropicoptinus bruchi	-	-	-	-	1	-	-	**1**
Tenebrionidae								
Alphitobius diaperinus	-	-	-	-	-	2	-	**2**
Epitragus sp.	-	-	-	-	-	1	-	**1**
Phobelius crenatus	7	1	5	8	-	1	23	**45**
Strongilium sp.	-	-	-	1	-	-	-	**1**

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APPENDIX 3. (Continuation)

Santiago del Estero (continuation)

	La María I-2009 # 1b	La María I-2009 # 2 b	La María II-2009 # 1	La María II-2009 # 2	La María II-2009 # 3	La María II-2009 # 4	La María II-2009 # 5	**TOTALS per sp.**
BLATTARIA								
Blattidae								
Periplaneta fuliginosa	-	-	1	-	-	-	-	**1**
ORTHOPTERA								
Grylloidea								
Undetermined sp.	-	-	1	-	-	-	-	**1**
HETEROPTERA								
Cydnidae								
Galgupha sp.	-	-	-	-	-	-	1	**1**
Reduviidae								
Triatominae								
Psammolestes coreodes								
Nymphs	1	-	-	4	-	-	3	**8**
Adults	3	-	4	-	-	-	-	**7**
Triatoma platensis								
Nymphs	-	-	-	-	1	-	-	**1**
Adults	1	-	-	-	-	-	-	**1**
DIPTERA								
Scenopinidae								
Undetermined sp.	-	-	-	2 L	-	1 L	-	**3 L**
Stratiomyidae								
Undetermined sp.	-	7 L	-	-	-	-	-	**7 L**
TOTALS per nest	**40**	**55**	**13**	**18**	**12**	**5**	**36**	**179**

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APPENDIX 3. (Continuation)

Santiago del Estero (continuation)

	La María II-2009 # 6	La María II-2009 # 7	La María II-2009 # 8	La María II-2009 # 9 (=3b)	La María II-2009 # 10 (=4b)	**TOTALS per sp.**
COLEOPTERA						
Undetermined larvae	-	4 L	-	-	-	**4 L**
Anobiidae						
Undetermined sp.	-	-	-	-	1	**1**
Aphodiidae						
Undetermined sp.	3	-	-	4	1	**8**
Carabidae						
Mimodromius sp.	1	-	-	-	-	**1**
Chrysomelidae						
Bruchinae						
Scutobruchus sp.	-	-	1	-	-	**1**
Clytrinae						
Metallactus sp.	-	44 Lc	-	192 Lc	51 Lc	**287 Lc**
Coccinellidae						
Cycloneda ancoralis	-	70	386	-	-	**456**
Cycloneda puncticollis	-	1	2	-	-	**3**
Curculionidae				-	-	
Ctenomyophila striata	6	6	2	18	3	**35**
Dermestidae						
Larvae						
Long black larvae (sp. 1)	2 L	27 L	14 L	188 L	213 L [3 L]	**444 L**
Big brown hairy larvae (sp. 6)	-	1 L	-	-	-	**1 L**
Adults emerged						
Trogoderma sp. 1	1	1	-	67	178	**247**
Histeridae						
Omalodes marseuli	1	-	-	1	-	**2**
Saprinus sp.	-	-	-	1	6	**7**
Ptinidae						
Undetermined sp.	1	-	-	-	-	**1**
Tenebrionidae						
Tenebrionini undetermined	-	-	3	-	-	**3**
Phobelius crenatus	-	5	3	-	1	**9**

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APPENDIX 3. (Continuation)

Santiago del Estero (continuation)

	La María II-2009 # 6	La María II-2009 # 7	La María II-2009 # 8	La María II-2009 # 9 (=3b)	La María II-2009 # 10 (=4b)	**TOTALS per sp.**
BLATTARIA						
Blattidae						
Periplaneta fuliginosa	-	-	1	-	-	**1**
HETEROPTERA						
Reduviidae						
Triatominae						
Psammolestes coreodes						
Nymphs		38	1	-	-	**39**
Adults		17	-	-	-	**17**
Triatoma platensis						
Nymphs	3	-	-	-	-	**3**
Adults	1	-	-	-	-	**1**
HYMENOPTERA						
Formicidae						
Camponotus sp.	17	-	-	-	-	**17**
DIPTERA						
Scenopinidae						
Undetermined sp.	-	-	-	-	3 L	**3 L**
Stratiomyidae						
Undetermined sp.	1 L	-	-		22 L	**23 L**
TOTALS per nest	**34**	**142**	**399**	**91**	**190**	**856**

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APPENDIX 3. (Continuation)

Chaco

	R 90 3-XII-08 # 1	R 90 3-XII-08 # 3	R 90 3-XII-08 # 3 M	R 90 3-XII-08 # 4 M	R 90 3-XII-08 # 5 M	R 90 4-XII-08 # 4 ceibo	A. Terai 6-I-09 # 6	**TOTALS per sp.**
COLEOPTERA								
Anobiidae								
Undetermined sp.	-	-	2	3	-	-	-	**5**
Aphodiidae								
Undetermined sp.	-	30	-	-	18	1	1	**50**
Carabidae								
Selenophorus mendicus	14	4	-	-	-	-	-	**18**
Cerambycidae								
Undet. sp. (Acanthocinini)	-	-	-	-	-	1	-	**1**
Chrysomelidae								
Clytrinae								
Metallactus sp.	-	-	-	-	-	-	17 Lc	**17 Lc**
Curculionidae								
Ctenomyophila striata	3	2	-	6	11	1	-	**23**
Coeliodes bruchi	-	-	1	1		-	-	**2**
Undetermined sp. 14	-	-	-	1	-	-	-	**1**
Dermestidae								
Larvas								
Big brown hairy larvae (sp. 6)	-	-	-	-	-	-	9 L	**9 L**
Adults emerged								
Trogoderma sp. 6	-	-	-	-	-	-	5 [1 P]	**5**
Adults in the nest								
Trogoderma sp. 6	-	-	-	-	-	-	2	**2**
Elateridae								
Aeolus sp. 1	1	-	2	-	-	-	-	**3**
Histeridae								
Saprinus sp.	-	3	-	-	-	4	2	**9**
Ptinidae								
Undetermined sp.	-	-	-	-	-	-	1	**1**
Tenebrionidae								
Alleculla sp.	-	-	-	-	-	2	-	**2**
Epitragus sp.	-	-	[1]	-	-	-	1	**1**
Phobelius crenatus								
Larvae	2 L	-	-	-	-	125 L	10 L	**137 L**
Adults	6	3	-	1	4 [1]	82	16	**112**

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APPENDIX 3. (Continuation)

Chaco (continuation)

	R 90 3-XII-08 # 1	R 90 3-XII-08 # 3	R 90 3-XII-08 # 3 M	R 90 3-XII-08 # 4 M	R 90 3-XII-08 # 5 M	R 90 4-XII-08 # 4 ceibo	A. Terai 6-I-09 # 6	**TOTALS per sp.**
BLATTARIA								
Undetermined sp.	-	-	-	-	-	2	-	**2**
ORTHOPTERA								
Grylloidea								
Undetermined sp.	-	4	-	-	-	-	-	**4**
HETEROPTERA								
Pentatomidae								
Olbia caprina	-	-	-	-	-	1	-	**1**
Reduviidae								
Triatominae								
Psammolestes coreodes								
Eggs	-	-	-	-	-	2 e	2 e (1 oe)	**4 e**
Nymphs	-	-	-	-	-	28	137	**165**
Adults	-	-	-	-	-	2	6	**8**
HYMENOPTERA								
Formicidae								
Camponotus rufipes	-	-	-	6	1	-	-	**7**
Pseudomyrmex sp.	-	-	-	-	-	2	-	**2**
Zacryptocerus sp.	-	-	-	-	-	4	-	**4**
Vespidae								
Polistes carnifex	4	3	-	-	-		-	**7**
DIPTERA								
Muscidae								
Philornis sp.	-	-	-	1 eP	-	-	-	**1 eP**
Stratiomyidae								
Undetermined sp.	4 L	-	1 eP	-	-	-	65 L	**69 L, 1 eP**
LEPIDOPTERA								
Pyralidae								
Undetermined sp.	-	-	-	-	-	-	1 L	**1 L**
TOTALS per nest	**28**	**49**	**5**	**18**	**34**	**130**	**171**	**435**

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APPENDIX 3. (Continuation)
Córdoba

	H. Grande 21-I-08	H. Grande 22-X-08 # 1	H. Grande 22-X-08 # 2	3 km E 28-X-09	**TOTALS per sp.**
Chrysomelidae					
Bruchinae					
Scutobruchus sp.	-	76	-	2	**78**
Cassidinae					
Botanochara duodecimverrucata	-	26	-	71	**97**
Botanochara octoplagiata	-	4	7	6	**17**
Clytrinae					
Metallactus sp.	1 L	-	-	-	**1 L**
Coccinellidae					
Cycloneda ancoralis	-	-	7	10	**17**
Curculionidae					
Coeliodes bruchi	-	1	-	-	**1**
Menetypus platensis	1	-	-	-	**1**
Dermestidae					
Dermestes peruvianus	-	-	-	1	**1**
Elateridae					
Conoderus pseudoscalaris	3	-	-	-	**3**
Heteroderes rufangulus	-	-	-	1	**1**
Histeridae					
Saprinus sp.	-	1	-	1	**2**
Tenebrionidae					
Lobopoda breyeri	-	1	-	-	**1**
HETEROPTERA					
Pentatomidae					
Chinavia musiva	-	-	-	3	**3**
Rhopalidae					
Corizus pictipes	-	6	-	-	**6**
Scutelleridae					
Myssipus variabilis	-	-	1	-	**1**
HYMENOPTERA					
Formicidae					
Camponotus sp.	85	-	-	-	**85**
Vespidae					
Polistes cavapyta	-	10	-	-	**10**
DIPTERA					
Stratiomyidae					
Undetermined sp.	27 L	-	-	-	**27 L**
Tachinidae					
Undetermined sp. 3	-	-	-	1	**1**
TOTALS per nest	**89**	**125**	**15**	**96**	**325**

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APPENDIX 3. (Continuation)

Córdoba (continuation)

	M. Clavero 14-VII-09 # 1	M. Clavero 14-VII-09 # 2	M. Clavero 14-VII-09 # 3	**TOTALS por sp.**
Anobiidae				
Undetermined sp.	-	1	-	**1**
Chrysomelidae				
Cassidinae				
Botanochara duodecimverrucata	-	12 [1]	[1]	**12**
Botanochara octoplagiata	-	[13]	[3]	**[16]**
Criocerinae				
Lema bilineata	1	10	36 [4]	**47**
Coccinellidae				
Cycloneda ancoralis	-	-	[2]	
Cycloneda fulvipennis	-	1	-	**1**
Cycloneda sicardi	-	1	-	**1**
Curculionidae				
Ctenomyophila striata	-	1	-	**1**
Menetypus platensis	-	12	-	**12**
Dermestidae				
Larvae				
Long black larvae (sp. 8)	-	-	6 L (**)	**6 L**
Undetermined larvae	2 L	1 L	2 L	**5 L**
Adults emerged				
Undetermined gen., undet. sp.	1	-	1	**2**
Trogoderma sp. 8	-	-	1	**1**
Adults in the nest				
Trogoderma sp. 8	-	-	[1]	**[1]**
Histeridae				
Saprinus sp.	1	2	-	**3**
Tenebrionidae				
Epitragus sp.	1	19	-	**20**
Phobelius crenatus	-	[1]	6 [3]	**6**
Undetermined sp. (Tenebrionini)	-	-	[1]	

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APPENDIX 3. (Continuation)

Córdoba (continuation)

	M. Clavero 14-VII-09 # 1	M. Clavero 14-VII-09 # 2	M. Clavero 14-VII-09 # 3	**TOTALS por sp.**
HETEROPTERA				
Phymatidae				
Macrocephalus tuberosus	1	-	-	**1**
Pentatomidae				
Chinavia musiva	19 [7]	16 [5]	6 [4]	**41**
Euchistos longipes	1	1	-	**2**
Rhopalidae				
Corizus pictipes	-	1	-	**1**
Harmostes prolixus	1	-	-	**1**
Scutelleridae				
Myssipus variabilis	9	1	1 [1]	**11**
HYMENOPTERA				
Eumenidae				
Undetermined sp.	-	5	-	**5**
Formicidae				
Camponotus mus	224	-	-	**224**
DIPTERA				
Fannidae				
Fannia sp.	24 eP [5 P]	-	-	**24 eP [5 P]**
Stratiomyidae				
Undetermined sp.				
Larvae	112 L	99 L [2 L]	[6 L]	**211 L [8 L]**
Emerged puparia in the nest	-	-	13 eP	**13 eP**
Adults emerged	2	-		**2**
TOTALS per nest	**261**	**83**	**51**	**395**

(**) five larvae die.

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APPENDIX 3. (Continuation)

Córdoba (continuation)

	M. Clavero 23-IX-09 # 1	M. Clavero 23-IX-09 # 2	M. Clavero 25-XI-09 # 1	M. Clavero 25-XI-09 #2	**TOTALS Per sp.**
COLEOPTERA					
Carabidae					
Dromius negrei	-	-	-	5	**5**
Mimodromius rugosus	1	-	1	1	**3**
Chrysomelidae					
Bruchinae					
Scutobruchus sp.	9	-	-	-	**9**
Stator sp.	2	-	-	-	**2**
Cassidinae					
Botanochara duocecimverrucata	12	8	-	11	**31**
Botanochara octoplagiata	4	2	-	-	**6**
Criocerinae					
Lema bilineata	11	4	-	-	**15**
Coccinellidae					
Cycloneda ancoralis	38	2	-	16	**56**
Cycloneda fulvipennis	1	-	-	-	**1**
Cycloneda sicardi	1	-	-	-	**1**
Solanophila paenulata	2	-	-	-	**2**
Curculionidae					
Ctenomyophila striata	-	-	1		**1**
Menetypus platensis	6	2	-		**8**
Dermestidae					
Larvae					
Dermestes peruvianus	-	-	3 L	-	**3 L**
Long black larvae (sp. 8)	6 L	-	-	3 L	**9 L**
Undetermined larva	1 L	-	-	-	**1 L**
Adults emerged					
Trogoderma sp. 8	6	-	3	3	**12**
Undetermined gen., undet. sp.	1	-	-	-	**1**
Adults in the nests					
Dermestes peruvianus	-	3	3	-	**6**
Trogoderma sp. 8	-	-	11	-	**11**
Megatoma ? sp. (sp. 7)	-	-	9	-	**9**
Histeridae					
Saprinus sp.	-	2	1	3	**6**
Tenebrionidae					
Epitragus sp.	2	-	-	-	**2**
Phobelius crenatus	-	1	-	1	**2**

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APPENDIX 3. (Continuation)

Córdoba (continuation)

	M. Clavero 23-IX-09 # 1	M. Clavero 23-IX-09 # 2	M. Clavero 25-XI-09 # 1	M. Clavero 25-XI-09 # 2	**TOTALS Per sp.**
HETEROPTERA					
Pentatomidae					
Chinavia musiva	3	-	-	-	**3**
Reduviidae					
Triatominae					
Triatoma sp. (**Note**)	-	-	4 e	-	**4 e**
Scutelleridae					
Myssipus variabilis	22	-	-	1	**23**
DIPTERA					
Scenopinidae					
Undetermined sp.	-	-	3 L	-	**3 L**
Stratiomyidae					
Undetermined sp.	-	-	-	422 L	**422 L**
TOTALS per nest	**121**	**24**	**29**	**41**	**215**

Note: Probably of *Triatoma platensis* because this species was found in other nests from the same locality.

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APPENDIX 3. (Continuation)

Córdoba (continuation)

	M. Clavero 22-I-10 # 1	M. Clavero 22-I-10 # 2	M. Clavero 22-I-10 # 3	**TOTALS per sp.**
COLEOPTERA				
Anobiidae				
Undetermined sp.	-	1	-	**1**
Carabidae				
Dromius negrei	2	1		**3**
Mimodromius rugosus	-	-	2	**2**
Chrysomelidae				
Criocerinae				
Lema bilineata	-	2	-	**2**
Coccinellidae				
Cycloneda ancoralis	-	15	-	**15**
Curculionidae				
Coeliodes bruchi	-	1	-	**1**
Ctenomyophila striata	-	3	6	**9**
Dermestidae				
Larvae				
Dermestes peruvianus	-	35 L	1 L	**36 L**
Long black larvae (sp. 8)	-	13 L	33 L	**46 L**
Adults emerged				
Dermestes peruvianus	-	4	1	**5**
Trogoderma sp. 8	-	5	11	**16**
Adults in the nests				
Megatoma ? sp. (sp. 7)	-	1	-	**1**
Trogoderma sp. 1	1	-	-	**1**
Trogoderma sp. 8	-	1	5	**6**
Histeridae				
Saprinus sp.	-	5	-	**5**
Tenebrionidae				
Phobelius crenatus	1	-	2	**3**
HYMENOPTERA				
Formicidae				
Camponotus mus	3	-	-	**3**
Camponotus sp.	1	-	-	**1**

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APPENDIX 3. (Continuation)

Córdoba (continuation)

	M. Clavero 22-I-10 # 1	M. Clavero 22-I-10 # 2	M. Clavero 22-I-10 # 3	**TOTALS per sp.**
HETEROPTERA				
Reduviidae				
Triatominae				
Triatoma platensis				
Nymphs in the nests	8 n	-	2 n	**10 n**
Nymphs died	[6]	-	-	
Adults emerged	1	-	2	**3**
Scutelleridae				
Myssipus variabilis	-	-	1	**1**
BLATTARIA				
Blaberidae				
Blaptica dubia	-	1	-	**1**
TOTALS per nest	**5**	**40**	**30**	**75**

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APPENDIX 3. (Continuation)

La Pampa

	Santa Rosa 7-II-08	Santa Rosa 2-III-08	Santa Rosa 6-V-08	Santa Rosa 23-IV-09	**TOTALS per sp.**
Anobiidae					
Undetermined sp.	2	-	-	4	**6**
Carabidae					
Dromius negrei	-	1	-	-	**1**
Cavognathidae					
Taphropiestes plaumanni	1	-	-	-	**1**
Chrysomelidae					
Criocerinae					
Lema bilineata	5	[1]	21	-	**26**
Coccinellidae					
Cycloneda ancoralis	1416 [1]	574 [9]	2404	-	**4394**
Hiperaspis sp. 1	-	-	3	2	**5**
Hiperaspis sp. 2	-	-	1	10	**11**
Stenadalia nordenskjoldi		1	-	7	**8**
Curculionidae					
Ctenomyophila striata	1	-	2	-	**3**
Menetypus platensis	[1]	-	-	2	**2**
Undetermined sp. 35	1	-	-	-	**1**
Dermestidae					
Larvae					
Long black larvae	-	3 L	-	7 L	**10 L**
Adults emerged					
Trogoderma sp. 1		1		-	**1**
Megatoma ? sp. (sp. 7)	-	1	-	-	**1**
Elateridae					
Undetermined sp. 4	-	-	-	1	**1**
Histeridae					
Saprinus sp.	-	-	1	-	**1**
Tenebrionidae					
Epitragus sp.	-	-	-	3	**3**
Lobopoda breyeri	1	2	-	-	**3**

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APPENDIX 3. (Continuation)

La Pampa (continuation)

	Santa Rosa 7-II-08	Santa Rosa 2-III-08	Santa Rosa 6-V-08	Santa Rosa 23-IV-09	**TOTALS per sp.**
HETEROPTERA					
Pentatomidae					
Chinavia musiva	148 [9]	11 [15]	122	123	**404**
Scutelleridae					
Myssipus variabilis	-	1 [1]	22	7	**30**
HYMENOPTERA					
Formicidae					
Camponotus sp.	13	-	2	-	**15**
Crematogaster sp.	1	-	-	-	**1**
DIPTERA					
Stratiomyidae					
Undetermined sp.	1 L	-	8 L	-	**9 L**
TOTALS per nest	**1589**	**592 [26]**	**2578**	**159**	**4918**