

## The genus *Leptanilla* EMERY, 1870 in Sicily (Hymenoptera: Formicidae)

Antonio SCUPOLA & Rodolfo BALLARIN



### Abstract

The genus *Leptanilla* EMERY, 1870 is recorded for the first time from Sicily. Swarming males of two, probably undescribed species were collected. Their morphological description is given, but no formal nomenclatorial acts are undertaken.

**Key words:** Formicidae, ants, *Leptanilla*, *Leptanilla* sp. SIC-1, *Leptanilla* sp. SIC-2, Sicily, first records, morphological characterisation.

Myrmecol. News 12: 129-132 (online 12 March 2009)

ISSN 1994-4136 (print), ISSN 1997-3500 (online)

Received 4 December 2008; revision received 3 February 2009; accepted 5 February 2009

Antonio Scupola (contact author), Museo Civico di Storia Naturale, Lungadige Porta Vittoria 9, I-37129 Verona, Italy. E-mail: antonio\_scupola@comune.verona.it

Rodolfo Ballarin, via S. Irene 8, I-37042 Caldiero (VR), Italy. E-mail: rodolfo.ballarin@tin.it

### Introduction

During his stay in Sicily one of us (RB) collected many swarming males belonging to the genus *Leptanilla* EMERY, 1870. It is the first record of the genus from that important Mediterranean island. We could recognize two species, whose external morphology and aedeagi are remarkably different from those of any other *Leptanilla* known so far. They probably belong to two new species; but the taxonomic knowledge of the genus is still poor. In fact most *Leptanilla* taxa are based either on males or on female castes: no collectors have ever found conspecific sexes together, although OGATA & al. (1995) described a male they assigned to *L. japonica* BARONI URBANI, 1977. Nevertheless that specimen was collected isolated and in a different year; so, it is still somewhat uncertain it belongs to that taxon.

Therefore we do not formally name our Sicilian species, which could even belong to any already known species known from female castes only and occurring in neighbouring regions. For instance, males of Sardinian *Leptanilla* are still unknown. For such reasons, due to the biogeographic interest of the finding, we informally describe our specimens.

### Materials and methods

Most specimens (66 males) were dry mounted and other (30 males) are preserved in 95% ethanol and could be used for future DNA analysis. In fact, if in the coming years any females will be found in Sicily (possibly in the same location), it would be possible to compare males and females genetically, which then should facilitate establishing whether males and females are conspecific. Three specimens (used for drawings in the present paper) are kept on slides in Faure's solution (mixture of arabic gum, distilled water, glycerin and chloral hydrate).

All specimens are stored in the following institutions and personal collections: MSNM (Museo Civico di Storia Naturale, Milano, Italy), MSNV (Museo Civico di Storia Naturale, Verona, Italy), ASPC (A. Scupola pers. coll.), and RBPC (R. Ballarin pers. coll.).

Measurements, in millimetres, were taken by means of an ocular reticle mounted on a Leica MB3 stereomicroscope at 60× magnification. The data are presented as mean ± standard deviation, with minimum and maximum values in brackets.

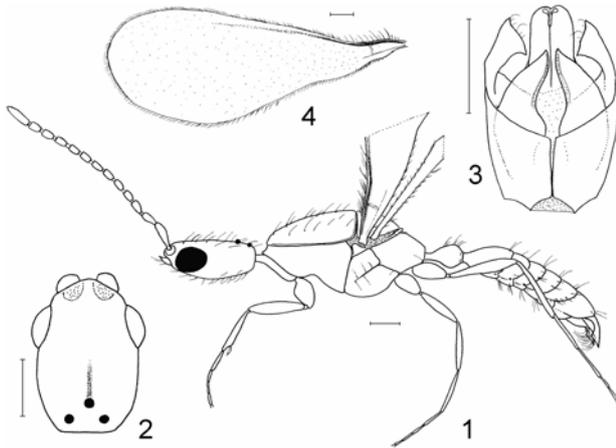
- HL Maximum length of head in full face view excluding mandibles, from midpoint of anterior clypeal margin to midpoint of vertexal profile.
- HW Maximum width of head in full face view, immediately behind eyes.
- ML Diagonal length of the mesosoma in profile from point where cervical shield curves into pronotal vertical face to margin of metapleural lobe.
- WL Maximum length of the forewing, measured through a median line from basal wing sclerites to distalmost margin of wing.
- WW Maximum width of forewing, measured at level of apex of marginal vein, from anterior margin (costal) to posterior margin of wing.
- TL Total length, measured as maximum outstretched length of body.

### *Leptanilla* sp. SIC-1 (Figs. 1 - 4)

**Material examined.** 60 males. Italy: Sicily, Pachino (Siracusa province), 36° 43' N, 15° 06' E, 15.VIII.2003, leg. R. Ballarin (ASPC, MSNM, MSNV, RBPC).

**Measurements.** 60 males measured: TL 1.3 ± 0.034 [1.2 - 1.4]; HL 0.28 ± 0.009 [0.24 - 0.29]; HW 0.20 ± 0.008 [0.17 - 0.21]; ML 0.51 ± 0.008 [0.48 - 0.53]. 31 males measured: WL 1.36 ± 0.028 [1.28 - 1.39]; WW 0.51 ± 0.018 [0.48 - 0.54].

**Informal description of male.** Light brown. Body shiny with sparse raised setae. Head (Fig. 2) much longer than wide, with shallow median longitudinal furrow running from mid ocellus to mid-length of frons. Ocelli large and protruding. Antennae 13-jointed, reaching insertions of forewings when extended backwards. First funicular joint



Figs. 1 - 4: *Leptanilla* sp. SIC-1, male (scale bar 0.10 mm). (1) Habitus; (2) head in dorsal view; (3) aedeagus in ventral view; (4) anterior wing.

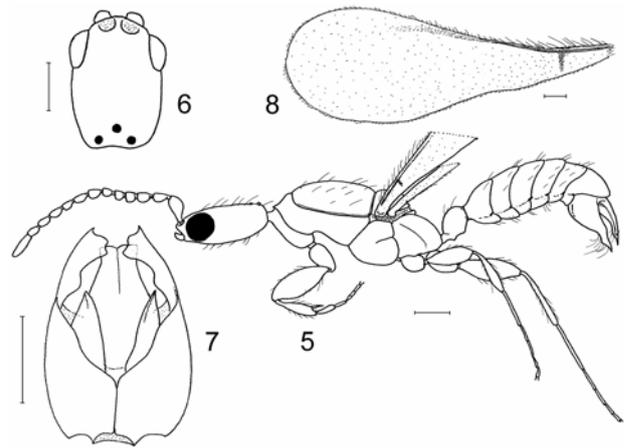
slender and a little wider than others, twice as long as wide, much narrower basally than apically. Funicular joint II slightly shorter than joint I, but longer than joint III. Remaining segments longer than wide. Apical joint as long as the two previous ones combined. Scape slightly bulging medially and convex dorsally, as long as funicular joints I + II. Mandibles poorly developed, edentate, rounded and shovel-shaped, with slightly concave masticatory edge. Mesosoma in dorsal view narrow, not wider than head and longitudinally grooved. Mesonotum about 2.5 as long as wide. Scutellum less than half as long as mesoscutum, rounded, weakly convex, not protruding beyond body outline. In profile, mesokatepisternum and anepisternum not fully separated by pleural furrow, which appears strongly chitinized and does not reach anterior edge of mesopleuron. Propodeum unarmed, its dorsum curving gradually towards petiole. Forefemora slightly medially enlarged. Petiole pear-shaped, more convex dorsally, and with anteriorly slightly concave sternite. Aedeagus (Fig. 3): Stipes curved inward at their apexes, which are wide and triangular. Volsellae apically pointed. Sagittae apically rounded, with two small symmetrical concavities at their upper inner edge. Forewings (Fig. 4) coated with many short bristles, which are much longer along wing's edge. With marginal vein running along leading edge, reaching beyond mid-length of wing. Pterostigma absent. Vestige of a transverse veinlet (abscissa RS + M, sensu BOLTON 1990) present at base of marginal vein, perpendicularly detached from latter, but not reaching posterior edge of wing. Faint, unpigmented anal vein also present. Hind wings extremely narrow and veinless.

#### *Leptanilla* sp. SIC-2 (Figs. 5 - 8)

**Material examined.** 6 males. Italy: Sicily, Pachino (Siracusa province), 36° 43' N, 15° 06' E, 15.VIII.2003, leg. R. Ballarin (ASPC, MSNM, MSNV, RBPC).

**Measurements.** 6 measured: TL  $1.08 \pm 0.031$  [1.0 - 1.2]; HL  $0.23 \pm 0.008$  [0.22 - 0.24]; HW  $0.15 \pm 0.005$  [0.14 - 0.16]; ML  $0.42 \pm 0.012$  [0.40 - 0.43]. 3 measured: WL  $1.22 \pm 0.33$  [1.18 - 1.25]; WW  $0.43 \pm 0.39$  [0.38 - 0.45].

**Informal description of male.** Light brown. Body shiny, with sparse erect setae. Head (Fig. 6) much longer than wide and dorsally depressed. Ocelli protruding. An-



Figs. 5 - 8: *Leptanilla* sp. SIC-2, male (scale bar 0.10 mm). (5) Habitus; (6) head in dorsal view; (7) aedeagus in ventral view; (8) anterior wing.

tennae 13-jointed, not reaching insertions of forewings when extended backwards. First funicular joint sub-triangular and transverse, wider than following ones. Funicular joint III transversely triangular and longer than joint IV. Funicular joints IV - VI sub-quadrata. Funicular joints VII - XI slightly longer than wide. Apical funicular joint as long as two previous ones combined. Scape club-shaped and apically very convex dorsally, as long as funicular joints I + II. Mandibles poorly developed, shovel-shaped, rounded and with concave masticatory edge. Mesosoma in dorsal view as wide as head and depressed. Mesonotum about 2.5 times as long as wide. Scutellum less than half as long as mesoscutum, weakly convex and slightly protruding beyond body outline. In profile, mesokatepisternum and anepisternum not fully separated by pleural furrow, which does not reach anterior edge of mesopleuron. Propodeum unarmed, its dorsum gradually curving towards petiole. Forefemora very enlarged along their entire length. Petiole pear-shaped, with more convex and rounded dorsum; petiolar sternite slightly concave in middle. Aedeagus (Fig. 7): Stipes slightly curved and with sinuous inner side and undulate, pointed apex. Volsella as well as apically truncated sagitta spoon-shaped. Forewings (Fig. 8) with very rounded distal margin and coated with many short bristles, which are longer along wing's edge. With marginal vein running along leading edge, reaching mid-length of wing. Pterostigma absent. Trace of a transverse veinlet (abscissa RS + M, sensu BOLTON 1990) present at base of marginal vein, perpendicularly detached from latter, but not reaching posterior edge of wing. Hind wings extremely narrow, with sinuous leading edge, and veinless.

#### Discussion

BARONI URBANI (1977) and PETERSEN (1968) pointed out that our taxonomic knowledge of the rarely collected ants of the genus *Leptanilla* is very fragmentary. Many species are based either on males or on female castes. This taxonomic situation is shared with other ant genera (e.g., *Dorylus*) too, and is due to the difficulty in finding the two sexes together, mainly because gynes are wingless and cannot swarm together with males. BOLTON (1995) reported 36 species of *Leptanilla*, 16 of which are known from males only. In the

Mediterranean region, 8 out of 17 species of *Leptanilla* were described from males only.

At present in Italy there are rare records of workers only, belonging to three species: *L. revelierii* EMERY, 1870 (senior synonym of *L. revelierii* ssp. *sardoa* EMERY, 1916, according to BARONI URBANI 1977) and *L. doderoi* EMERY, 1915 from Sardinia (see also LEO & FANCELLO 1990), and *L. poggii* MEI, 1995, endemic to Pantelleria. No records of the genus from Sicily were known so far. However, Sicily shares several ant species with North Africa and even with Sardinia. Thus, the discovery of *Leptanilla* in Sicily fills a gap in the distribution of the genus.

From a taxonomic point of view, our two species can be distinguished through the following morphological traits:

*Leptanilla* sp. SIC-1: Head (Fig. 2) 1.38 - 1.43 times longer than wide, with straight vertex. Median longitudinal furrow running from midlength of frons to mid-ocellus. Scape slightly enlarged. Funicular joints elongate, with first one slightly longer and wider than second; third joint shorter than second. Forewings (Fig. 4) with transverse, faint and hardly pigmented basal vein (abscissa RS + M sensu BOLTON 1990. We believe that it could be homologous with the CuA transverse veinlet because of its basal position, and for its perpendicular direction. This would also imply that Cu would have been fused into the marginal vein.) Legs: simple, forefemora not enlarged. Aedeagus parallel sided and with apically rounded sagitta (Fig. 3).

*Leptanilla* sp. SIC-2: Head (Fig. 6) 1.44 - 1.55 times longer than wide. Vertex slightly concave. Scape very enlarged and club-shaped. Funiculus with subquadrate, transverse joints, first one enlarged and rounded, wider than following ones. Legs with strongly enlarged forefemora. Wings (Fig. 8) with basal transverse and pigmented veinlet. Aedeagus (Fig. 7): stipes very sinuous at their inner side and apically undulate; sagitta apically truncate.

All of the above mentioned features quite easily differentiate both Sicilian species from any other known male of *Leptanilla*.

After a comparison of our two Sicilian species with the descriptions of other Mediterranean ones (EMERY 1870, EMERY 1899, FOREL 1903, SANTSCHI 1907, SANTSCHI 1908, EMERY 1915, SANTSCHI 1915, BARONI URBANI 1977, KUGLER 1987, BARANDICA & al. 1994, LOPEZ & al. 1994, MEI 1995), we can state that *L. israelis* KUGLER, 1987 is the closest to *L. sp. SIC-1*. However, *L. israelis*' head is said to be 1.20 - 1.25 longer than wide and does not have a median furrow; its anterior wing has a weakly developed and poorly pigmented basal vein. Furthermore, the aedeagus has stipes with apical margin faintly concave and rounded; the sagitta is wider with converging sides and rounded apex.

Another similar species is *L. bifurcata* KUGLER, 1987. However, it has an aedeagus with entirely different features (i.e., forked stipes). Another species, *L. tanit* SANTSCHI, 1907 is apparently similar, but it has distinctly longer setae, shorter head, a different aedeagus and its wing lacks the basal veinlet.

Among species with enlarged femora, *L. minuscula* SANTSCHI, 1907 is the closest to *L. sp. SIC-2*; but the latter is clearly distinguishable from *L. sp. SIC-2* because its head is much shorter, its body is much darker (yellow in *L. minuscula*), and its aedeagus too is different (Fig. 8). These features (in particular the aedeagus) clearly differentiate our species even from the other two belonging to the same

group, namely *L. exigua* SANTSCHI, 1908 and *L. tenuis* SANTSCHI, 1907.

Finally, it must be pointed out that the aedeagi of both our Sicilian species are significantly different from BARONI URBANI's (1977) species A (Spain) and B (Tunisia) and from all the other *Leptanilla* males known so far.

#### **List of the Mediterranean *Leptanilla* known from males only:**

*L. bifurcata* KUGLER, 1987 – Israel  
*L. exigua* SANTSCHI, 1908 – Tunisia  
*L. israelis* KUGLER, 1987 – Israel  
*L. minuscula* SANTSCHI, 1907 – Tunisia  
*L. tanit* SANTSCHI, 1907 – Tunisia  
*L. tenuis* SANTSCHI, 1907 – Tunisia  
*L. sp. A* in BARONI URBANI (1977) – Tunisia  
*L. sp. B* in BARONI URBANI (1977) – Spain  
*L. sp. SIC-1* in present paper – Sicily  
*L. sp. SIC-2* in present paper – Sicily

#### **List of the Mediterranean *Leptanilla* known from female castes only:**

*L. charonea* BARANDICA, LÓPEZ, MARTINEZ & ORTUNO, 1994 – Spain  
*L. doderoi* EMERY, 1915 – Sardinia  
*L. judaica* KUGLER, 1987 – Israel  
*L. nana* SANTSCHI, 1915 – Tunisia  
*L. ortunoii* LOPEZ, MARTINEZ & BARANDICA, 1994 – Spain  
*L. plutonia* LOPEZ, MARTINEZ & BARANDICA, 1994 – Spain  
*L. poggii* MEI, 1995 – Pantelleria island (Italy)  
*L. revelierii* EMERY, 1870 (incl. ssp. *bimaculata*, ssp. *chobauti*, ssp. *sardoa*) – Pyrenees, Corsica, Sardinia, Maghreb  
*L. theryi* FOREL, 1903 – Algeria, Tunisia  
*L. vaucheri* EMERY, 1899 – Morocco  
*L. zaballosi* BARANDICA, LÓPEZ, MARTINEZ & ORTUNO, 1994 – Spain

#### **Acknowledgements**

We wish to greatly thank Fabrizio Rigato (MSNM) for his indispensable and constant support, especially for his critical revision and help with the English version of the article, and Roberto Poggi (MSNG) for the loan of the types of the Emery collection. We are also grateful to Dino Bernardo (Verona) and Rosalind Pucci (London). Finally we must thank the editors Birgit C. Schlick-Steiner, Florian M. Steiner (Innsbruck) and Herbert Zettel (Wien) for their help and Barry Bolton (London) and an anonymous referee for their comments and corrections.

#### **Zusammenfassung**

Die Gattung *Leptanilla* EMERY, 1870 wird erstmals für Sizilien gemeldet. Es wurden schwärmende Männchen von zwei wahrscheinlich unbeschriebenen Arten gesammelt. Diese beiden Arten werden hier morphologisch charakterisiert, aber es wird kein formeller nomenklatorischer Akt vollzogen.

#### **References**

- BARANDICA, J.M., LÓPEZ, F., MARTINEZ, M.D. & ORTUNO, V.M. 1994: The larvae of *Leptanilla charonea* and *zaballosi* (Hymenoptera: Formicidae). – Deutsche Entomologische Zeitschrift 41: 147-153.
- BARONI URBANI, C. 1977: Materiali per una revisione della sottofamiglia Leptanillinae (Hymenoptera: Formicidae). – Entomologica Basiliensia 2: 427-488.

- BOLTON, B. 1990: The higher classification of the ant subfamily Leptanillinae (Hymenoptera Formicidae). – *Systematic Entomology* 15: 267-282.
- BOLTON, B. 1995: A new general catalogue of the ants of the world. – Harvard University Press, Cambridge, MA, 504 pp.
- EMERY, C. 1870: Studi mirmecologici. – *Bollettino della Società Entomologica Italiana* 2: 193-201.
- EMERY, C. 1899: Glanures myrmécologiques [Hymen.]. – *Bulletin de la Société Entomologique de France* 1899: 17-20.
- EMERY, C. 1915: Contributo alla conoscenza delle formiche delle isole italiane. Descrizione di forme mediterranee nuove o critiche. – *Annali del Museo Civico di Storia Naturale* 46: 244-270.
- EMERY, C. 1916: Fauna Entomologica Italiana. I. Hymenoptera. – Formicidae. – *Bollettino della Società Entomologica Italiana* 47: 79-275.
- FOREL, A. 1903: Melanges entomologiques, biologiques et autres. – *Annales de la Société Entomologique de Belgique* 47: 249-268.
- KUGLER, J. 1987: The Leptanillinae (Hym. Formicidae) of Israel and a description of a new species from India. – *Israel Journal of Entomology* 20: 45-57.
- LEO, P. & FANCELLO, L. 1990: Osservazioni sul genere *Leptanilla* EMERY in Sardegna e riabilitazione di *L. doderoi* EMERY. – *Bollettino della Società Entomologica Italiana* 122: 128-132.
- LOPEZ, F., MARTINEZ, M.D. & BARANDICA, J.M. 1994: Four new species of the genus *Leptanilla* (Hymenoptera: Formicidae) from Spain – relationships to other species and ecological issues. – *Sociobiology* 24: 179-212.
- MEI, M. 1995: Arthropoda di Lampedusa, Linosa e Pantelleria (Canale di Sicilia, Mar Mediterraneo). Hymenoptera, Formicidae (con diagnosi di due nuove specie). – *Il Naturalista Siciliano* 19 (Suppl.): 753-772.
- OGATA, K., Terayama, M. & Masuko, K. 1995: The ant genus *Leptanilla*: discovery of the worker-associated male of *L. japonica*, and a description of a new species from Taiwan (Hymenoptera: Formicidae: Leptanillinae). – *Systematic Entomology* 20: 27-34.
- PETERSEN, B. 1968: Some novelties in presumed males of Leptanillinae (Hymenoptera Formicidae). – *Entomologiske Meddelelser* 36: 577-598.
- SANTSCHI, F. 1907: Fourmis de Tunisie capturées en 1906. – *Revue Suisse de Zoologie* 15: 305-334.
- SANTSCHI, F. 1908: Nouvelles fourmis de l'Afrique du Nord (Égypte, Canaries, Tunisie). – *Annales de la Société Entomologique de France* 77: 517-534.
- SANTSCHI, F. 1915: Nouvelles fourmis d'Algérie, Tunisie et Syrie. – *Bulletin Société d'Histoire Naturelle Afrique du Nord* 7: 54-63.