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On the Auguste Forel ant collection in the Naturmuseum Solothurn, Switzerland: current state and illustrated type catalogue (Hymenoptera, Formicidae)

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Abstract: A collection of 457 specimens of Formicidae in 195 taxa from all over the World donated by Auguste Forel has been conserved since 1901 at the Naturmuseum Solothurn, Switzerland (NMSO). Hardly noticed by the scientific community, the collection includes 40 syntypes of 16 species and subspecies, and five paralectotypes from two species. To spread this knowledge, and to encourage the inclusion of the Formicidae collection in future taxonomic studies, all species from the collection are listed, and the types are catalogued and imaged.

Keywords: Formicidae, museum collection, type specimens, taxonomy, Auguste Forel, Solothurn, Switzerland.

INTRODUCTION

Auguste Forel (1848-1931) had been a passionate myrmecologist since his childhood. Born in Switzerland near Morges in the canton of Vaud he completed his medical studies in the year 1871 in Zurich. After a short stay in Vienna, where he deepened his knowledge in the field of neuroanatomy and neuropsychiatry, he passed the cantonal medical examination in Lausanne one year later. In 1873 Forel moved to Munich, where he intensively worked on his anatomical studies of the human brain (Parent, 2003) as well as on the Swiss ant fauna, crowned with his extensive work "Les fourmis de la Suisse" (Forel, 1874). From 1879 to 1898 he was director at the Burghölzli asylum in Zurich, and professor of psychiatry at the University of Zurich. Auguste Forel travelled a lot, and in 1889 and 1893 went on journeys to Tunisia and Algeria, in 1891 to Bulgaria (Forel, 1892b), and in the last years of his working career and after his retirement, he intensified travelling and visited Colombia in 1896, the United States and Canada in 1899, Eastern Europe and Russia in 1902, Egypt, Algeria, Tunisia, Italy in 1908, and in the following year he travelled from the Balkans to Greece and Turkey (Parent, 2003; Banani, 2005). After having suffered a stroke with partial paralysis in 1912 Forel was forced to stop his excursions.

In 1922 the main collection of Auguste Forel was sold to the Muséum d'histoire naturelle de Genève (MHNG). Apart from that collection doublets were given in 1923/1924 to the Zoological Museum Berlin, and a specific Swiss collection is conserved since the same date in the Musée de zoologie de Lausanne (MZL). A small overview collection remained in the possession of Forel's family (Horn & Kahle, 1935) and is conserved, presumably entirely, since 1981 also in the MZL (teste A. Freitag). In 1911 Forel visited the Zoologische Staatssammlung München (ZSM) (at that time Königlich Zoologisches Museum München) where he determined and described Formicidae, which was not mentioned by Horn & Kahle (1935). A series of types are therefore also at the ZSM (Merta, 1999). Similarly at the Naturhistorisches Museum der Burgergemeinde Bern (NMBE), not mentioned either in Horn & Kahle (1935), part of the Forel collection is conserved since 1911, comprising ant species from all over the World and syntype specimens. Interestingly, in the extensive online catalogue on biographies of entomologists of the Senckenberg Deutsches Entomologisches Institut, Müncheberg (SDEI Senckenberg, 2015) the Forel collection at the Naturmuseum Solothurn (NMSO) is mentioned.

Bloch (1940) provided an overview on all 457 specimens (from 174 species out of 64 genera at that time) of the Forel collection from localities all over the World conserved at the Naturmuseum Solothurn. The collection was first mentioned by Bloch (1911), where Forel himself is mentioned as donator of the collection. This was part of a common effort to contribute to the growing museum collection supported by other contemporaries (as Paul Born, Arnold Wullschlegel, E. Christ, Wilhelm Roos, Eduard Von Jenner, Fritz Rohr, Karl Ris, Emile Frey-Gessner, M. Bedot) under the lead of August Rätzer. At the NMSO the Forel collection is registered under the number "E. K. [Eingangskatalog = accessions catalogue]

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112" and is indicated as a donation dating back to 27th December 1901, long before his main collection was sold to the MHNG.
In the meantime the collection, formerly housed in an external depot, remained unexplored and unfortunately single specimens were destroyed by feeding of carpet beetles (Dermestidae). These damages – if relevant, e.g. not only single legs or antennae are missing – are reported in the following. The re-examination of species described (and mostly collected) by Forel, and comparisons with the very helpful AntWeb (2016) – where all historical literature is available – resulted in the discovery of syntype specimens. These were not yet adequately labelled and hence not recognisable as types at first sight. The knowledge of the existence of this ant collection at the NMSO is important for future taxonomic examinations. Therefore these specimens are listed and pictured in the following.
The determinations are those of Forel himself. Therefore, difficult genera and species-groups with subsequent new discoveries and/or species that have been split in the meantime should be carefully revised by any interested myrmecologist; a necessity which should be emphasized with this present contribution.

MATERIAL AND METHODS

Photos were taken with a 3.15-megapixel digital camera (ProgRes CT3) on a stereomicroscope (Nikon SMZ 1000) for the ant specimens, and a digital camera (Canon G 11) for the labels. Series of images were captured with ProgRes Capture Pro 2.8.8 for Windows and stacked with the freely available CombineZP Image Stacking Software by Alan Hadley.
Additional remarks and corrections to label data are set in square brackets [ ], mistakes by Bloch (1940) are additionally highlighted by a preceding asterisk at the beginning of the square brackets [*]. Specimens from different localities are separated by a dash (—). The original combination used on the labels in the Forel collection to every species is given in curly brackets { }.
All specimens of the Forel collection are registered in the database of the NMSO and these data are available on request for further investigations. The Forel collection at the NMSO is conserved in three regular sized insect boxes (51 x 42 x 6 cm). As a peculiarity, but usual at that time, only the first specimen of a series of separately pinned specimens is provided with a label.

ABBREVIATIONS

MHNG Muséum d'histoire naturelle de Genève (Switzerland)
NHMW Naturhistorisches Museum Wien (Austria)
NMBE Naturhistorisches Museum der Burgergemeinde Bern (Switzerland)
NMSO Naturmuseum Solothurn (Switzerland)
ZSM Zoologische Staatssammlung München (Germany)

RESULTS

Corrections, damaged and lost specimens

From the originally 457 specimens of the Forel collection, currently 426 from 195 taxa are still present in the collection of the NMSO (Appendix 1). Corrections as well as indications about damages or lost specimens are given for the 41 species below. 40 specimens are damaged and a few are lost. Bloch's paper (1940) contained a number of mistakes which are shown and corrected here under the respective species (ordered in alphabetical order):

- ***Acromyrmex disciger* (Mayr, 1887)** {*Atta* (*Acromyrmex*) *discigera*} 2 ☿ Blumenau [Brasilia] [leg.] Möller [head of one ☿ is lost].
- ***Aphaenogaster gibbosa* (Latreille, 1798)** 3 ☿ Souk Ahras [*Algeria; not Persia as in Bloch (1940)].
- ***A. treatae* Forel, 1886** 2 ☿ Tyorn 3400 "[feet] W.B. [has to be in the USA] 23.VII. [leg.] Forel.
- ***Camponotus cruentatus* (Latreille, 1802)** 3 ☿ près Montpellier, sous pierre [under stone] [one worker is heavily damaged; gaster, one leg and part of the head capsule are missing].
- ***C. maculatus* (Fabricius, 1782)** 3 ☿ Moyanga [=Moronga] Madagascar [the gaster of one of the workers is lost].
- ***Cyphomyrmex rimosus* (Spinola, 1851)** 3 ☿, 1 ♀ St. Vincent [São Vicente, Brasil] [of the ♀ only head and mesosoma are left].
- ***Dolichoderus quadripunctatus* (Linné, 1771)** 2 ☿ Vaux [the head of one is missing].
- ***Dorylus helvolus* (Linnaeus, 1764)** 3 ☿ Basutoland [today Lesotho] 14.VI. [*not 1914, as the collection dates back to 1901] [leg.] Wronghton.
- ***Eciton carolinense* Emery, 1894** 3 ☿ Faisons [= Faison] N. C. [North Carolina, USA] ds.[dans] tronc [in (tree) trunk].
- ***E. hamatum* (Fabricius, 1782)** 3 ☿ Bonda Columbia [leg.] Forel [one specimen without head].
- ***Forelius maccooki* (McCook, 1880)** 2 ☿ Austin Texas [collector illegible] [*no locality was given by Bloch (1940)].
- ***Formica pallidefulva* Latreille, 1802** 3 ☿ V...mera [illegible] Morganton [several localities in the USA are possible] N....trnc à mat [illegible] [one ☿ is lost].
- ***F. rubicunda* Emery, 1893** {*F. sanguinea rubicunda* Emery, 1893} 2 ☿ Tyson N.C. [North Carolina] coll. excl. *subsericea* 20.VII. [collected from *Formica subsericea* Say, 1836; provenance unclear according to Bloch (1940)].
- ***Formicoxenus nitidulus* (Nylander, 1846)** 1 ☿ luz. Ural geb. [Ural mountains ?].

- ***Goniomma hispanicum* (André, 1883)** 2 ☿ Camargue [*France; instead of unknown locality in Bloch (1940)] [leg.] Forel.
- ***Harpegnathos saltator cruentatus* (Smith, 1858)** {*H. cruentatus*} 1 ☿ Kanara [*India; instead of "Kanada" in Bloch (1940)] [leg.] Bell 8. [18]66.
- ***Iridomyrmex purpureus* (Smith, 1858)**: 2 ☿ Mackay, Queensland [Australia] [leg.] Turner [gasters of both specimens are missing].
- ***Lasius alienus* (Foerster, 1850)** 2 ☿: Adelsberg [not specified if in Germany or Austria; several localities are possible; one ☿ is partly destroyed, gaster and two legs remain].
- ***L. emarginatus* (Olivier, 1792)** 3 ☿: Adelsberg [same as above: not specified if in Germany or Austria; several localities are possible] 21.IX. [the head of one specimen is lost].
- ***L. flavus* (Fabricius, 1782)** 2 ♂, 1 ♀ Fisibach [canton AG, Switzerland] 7.VIII. [both ♂ are lost]. — 3 ☿ Fisibach.
- ***L. umbratus* (Nylander, 1846)** 2 ♂, 1 ♀ Burghölzli [Zurich] 30.IX. [one ♂ is lost]. — 2 ☿: München [Bayern, Germany].
- ***Leptogenys processionalis* (Jerdon, 1851)** {*L. ocellifera* (Roger, 1861)} 3 ☿ [*instead of no sex indicated] India, Ceylon.
- ***Liometopum microcephalum* (Panzer, 1798)** 2 ☿: Sare-Mussa [Bulgarien; the head of one specimen is lost].
- ***Manica rubida* (Latreille, 1802)** {*Myrmica*} 1 ♀, 1 ☿ Murgthal [Murgtal near Quarten canton SG, Switzerland] 9.IV. [both specimens almost destroyed].
- ***Messor arenarius* (Fabricius, 1787)** 2 ☿ [both severely damaged] Gabès [Tunesia] [leg.] Forel.
- ***M. barbarus* (Linné, 1767)** 1 ♀ Perrégaux [*today Mohammadia; not Perrigana as given by Bloch (1940)] Algérie 29.III. — 3 ☿ [one ☿ is completely destroyed] Laverdure [today Mechroha] Algérie, [leg.] Forel.
- ***M. structor* (Latreille, 1798)** 1 ♀, 2 ☿ [*not 3 ☿ as mentioned in Bloch (1940); and additionally 4 plant seeds glued on the edges of a label] Miramar Baléares [Spain; not Switzerland as interpreted by Bloch (1940)].
- ***Myrmica lobicornis* Nylander, 1846** 3 ☿ Elinine Vrh [*Rilo-Dagh mountains, Bulgaria; not "Schweizer Alpen" as mentioned by Bloch (1940)].
- ***M. nigrocincta* Smith, 1858** 1 ☿: Zullusland [Australia] [whole specimen lost; labels still present in the box].
- ***M. rubra* (Linné, 1758)** {*M. laevinodis* Nylander, 1846} 1 ♀, 3 ☿ Bali – Effendi [=Aféndis, Crete, Greece] [the ♀ is completely destroyed].
- ***M. ruginodis* Nylander, 1846** 3 ☿ [one ☿ is completely destroyed] Rilo mo…otis [*illegible, most probably Rilo mountains; Bulgaria instead of "In der ganzen Schweiz" (Bloch 1940)] .
- ***M. rugulosa* Nylander, 1849** 3 ☿ Murg [near Quarten canton SG]; [one ☿ completely destroyed, another one partly destroyed].
- ***M. scabrinodis* Nylander, 1846** 2 ♂, 1 ♀ and 1 ☿ [without head] Vaux [near Morges] 8.VIII. — 1 ☿: Vaux [near Morges] [the ♀ and one ♂ are completely destroyed].
- ***M. sulcinodis* Nylander, 1846** 3 ☿, 1 ♀ [*not only 3 ☿ as mentioned in Bloch (1940)]: Schluderbach [= Carbonin, Italian; South Tirol] [1 ☿ is completely destroyed].
- ***Pheidole megacephala* (Fabricius, 1793)** 1 ☿ Manà Prov. Rio [Brasilia] [leg.] Göldi. — 2 ☿: Madeira [Portugal] [leg.] Schmitz [one of them is completely destroyed]. — 1 ♀ Nosibé [Madagascar] [leg.] Völtzkow.
- ***P. pallidula* (Nylander, 1849)** 1 ♂ Ghadame [= Ghadamès, Lybia] (Ali). — 2 ☿, 1 ♀ Onsernone [*canton of Ticino, Switzerland; not mentioned in Bloch (1940)] [one ☿ is almost destroyed (gaster remaining), and parts of the gaster of the second one are missing]. — 2 ☿: Algier [leg.] Moser. 1 ☿ [only gaster plus postpetiolus and petiolus are remaining] Tebessa [leg.] Forel.
- ***Tapinoma erraticum* (Latreille, 1798)** 1 ♂ Vaux. — 1 ♀ Horgen 1.VII. — 2 ☿ Vaux [gasters of both workers are missing].
- ***Temnothorax recedens* (Nylander, 1856)** 2 ☿ [*not *suberis* Forel, 1894 as mentioned in Bloch (1940)] parc près Montpellier.
- ***T. tuberum* (Fabricius, 1775)** 3 ☿, 1 ♂ [1 ☿ and the ♂ are destroyed] Salève [France, near Geneva] 6.VI.
- ***T. unifasciatus* (Latreille, 1798)** 3 ☿ [where one ☿ is destroyed and another one heavily damaged (head missing)] Vaux [above Morges, Switzerland].
- ***Tetramorium guineense* (Bernard, 1953)** {*T. guineensis* (Fabricius, 1775)} 1 ☿ [completely destroyed] MacKay Queensland [Australia] 107 (Tarus) [?].

Annotated and illustrated catalogue of type specimens

In the following, 40 syntype specimens from 16 species and subspecies, 5 paralectotypes from two species and three former syntypes from a mixed type series are listed. Label data are mentioned verbatim in quotation marks. All type specimens were not yet marked or labelled as type specimens and hence difficult or not at all recognizable as such. Photos of the specimens and its original labels are given (Figs 1A-4S), and are available on request as maximally resolved images for scientific purposes. The types belong to species and subspecies published by Forel in the years 1887, 1890, 1892a, b, 1894a, b, 1899, 1901, and 1902. All species were compared with the original descriptions and – if type specimens were available – with AntWeb (2016). Details given in the descriptions, when necessary, are provided and additional references are included under

Fig. 1. Syntypes ☿ dorsal/lateral views. (A) *Strongylognathus huberi* Forel, 1874. (B) *Myrmica smythiesii* Forel, 1902. (C) *Monomorium indicum* Forel, 1902. (D) *Messor lobicornis* Forel, 1894. (E) *Camponotus bugnioni* Forel, 1899. (F) *Monomorium smithii* Forel, 1892. (G) *Temnothorax algiricus trabutii* (Forel, 1894). Scale bars 1 mm.

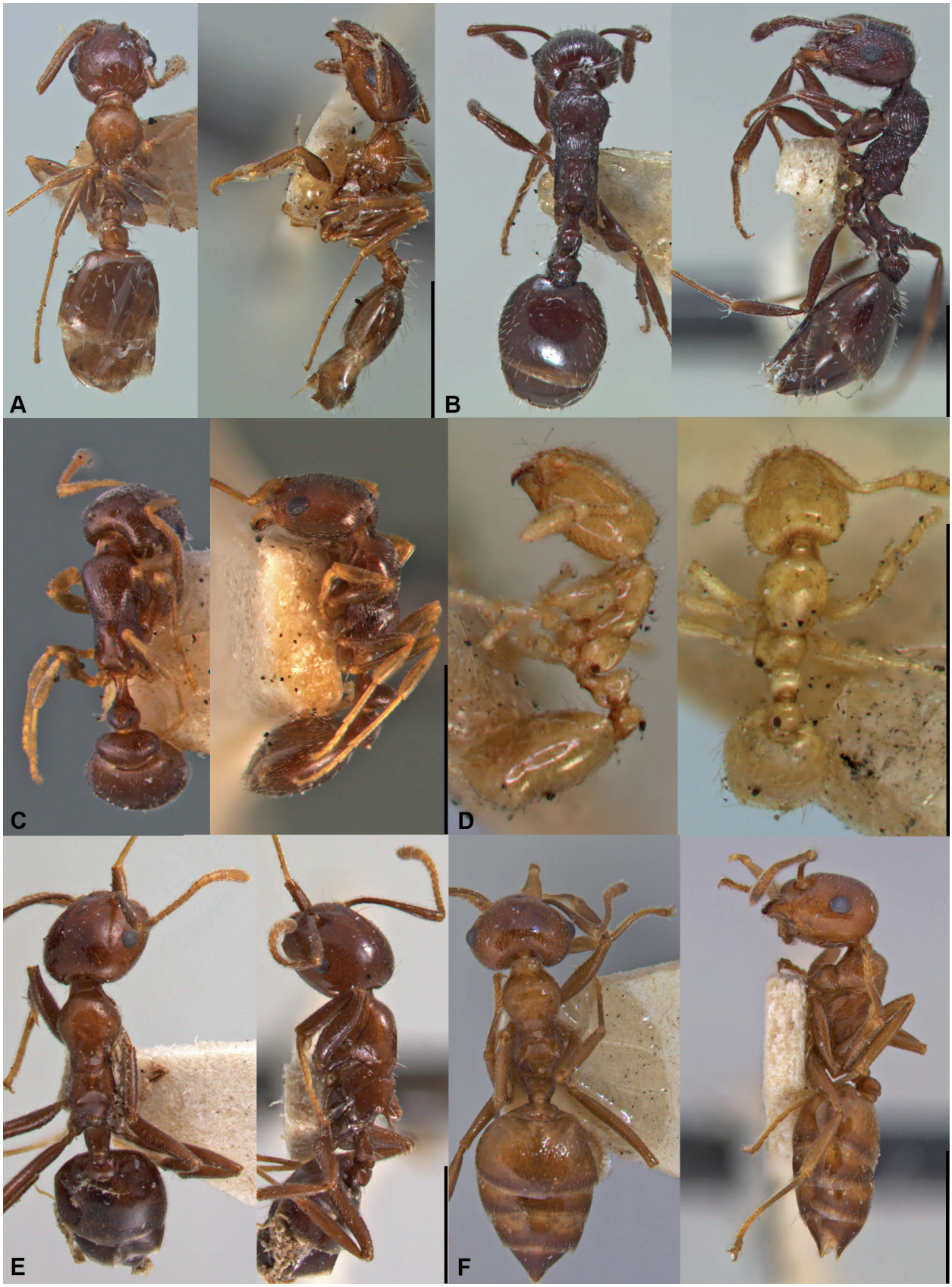

Fig. 2. Syntypes ☿ dorsal/lateral views. (A) *Temnothorax delaparti* (Forel, 1890). (B) *T. oraniensis* (Forel, 1894). (C) *Cardiocondyla stambuloffii* Forel, 1892. (D) *Solenopsis latro* Forel, 1894. (E) *Crematogaster ranavalonae* Forel, 1887. (F) Paralectotype of *C. daisyi* Forel, 1901. Scale bars 1 mm.

Fig. 3. (A) Paralectotype ☿ dorsal/lateral of *Pogonomyrmex mayri* Forel, 1899. (B) ☿ dorsal/lateral of *Azteca velox* Forel, 1899. (C) Syntypes ☿ of *A. delpini antillana* Forel, 1899. (D) *Lasius myops* Forel, 1894. (E) *Cataglyphis savignyi* (Dufour, 1862). (F) *Camponotus alii* Forel, 1890. Scale bars 1 mm.

Fig. 4. Original labels of 16 syntypes and 2 paralectotypes. (A) *Strongylognathus huberi* Forel, 1874. (B) *Myrmica smythiesii* Forel, 1902. (C) *Monomorium indicum* Forel, 1902. (D) *Messor lobicornis* Forel, 1894. (E) *Camponotus bugnioni* Forel, 1899. (F) *Monomorium smithii* Forel, 1892. (G) *Temnothorax algiricus trabutii* (Forel, 1894). (H) *Temnothorax delaparti* (Forel, 1890). (I) *T. oraniensis* (Forel, 1894). (J) *Cardiocondyla stambuloffii* Forel, 1892. (K) *Solenopsis latro* Forel, 1894. (L) *Crematogaster ranavalonae* Forel, 1887. (M) *C. daisyi* Forel, 1901. (N) *Pogonomyrmex mayri* Forel, 1899. (O) *Azteca velox* Forel, 1899. (P) *A. delpini antillana* Forel, 1899. (Q) *Lasius myops* Forel, 1894. (R) *Cataglyphis savignyi* (Dufour, 1862). (S) *Camponotus alii* Forel, 1890.

the respective species (listed here in alphabetical order within the respective subfamilies):

Dolichoderinae

***Azteca aurita* Emery, 1893** {*A. lacrymosa* Forel, 1899} 3 ancient syntypes of a mixed type series (☿), which have lost their syntypical status: "*A. lacrymosa* ☿ Forel type Esperanza, Colombie ([leg.] Forel) ...arton [illegible]". Longino (2007) revised the *Azteca aurita*-species group, and designated lectotypes. The syntype series is a mixed one and consists of two species: *Azteca pilosula* Forel, 1899 and *A. aurita*, to which the Columbian specimens are assigned nowadays.

***A. delpini antillana* Forel, 1899** (Figs 3C, 4P) 3 **syntypes** (☿): "*A. Delpini* Sm r. [race] *antillana* For ☿ Sta Lucia (Antille) [leg.] Forel". The locality fits perfectly with the description by Forel (1899: 111): "Hab. [Habitat] Antilles, St. Lucia (Forel)".

***A. velox* Forel, 1899** (Figs 3B, 4O) 3 ☿): "*A. velox* Forel ☿ Burithaka (Columbien) [=Buritaca, Colombia] [leg.] Forel". Forel (1899) mentioned his (re-)description: "…Colombie, pied de la Sierra Nevada (Forel)" which fits well with the label's locality, located north of the Sierra Nevada de Santa Marta. However, *A. velox* is a replacement name for *A. coeruleipennis* var. *fasciata* Pergande, 1896, based on homonymy. Hence Forel's specimens of *A. velox* are not syntypes, but are included and illustrated here to avoid misinterpretations.

Formicinae

***Camponotus alii* Forel, 1890** (Figs 3F, 4S) 3 **syntypes** (☿): "*C. alii* ☿ Forel Djebel Ozmor p. Tebessa, 1380 m (Forel) Type". The label data corresponds perfectly with the original description by Forel (1890: LXIII) where he stated: "Forêts de pins du Djébel Ozmor près Tébessa de 1100 à 1300 mètres...".

***C. bugnioni* Forel, 1899** (Figs 1E, 4E) 3 **syntypes** (☿): "*C. Bugnioni* ☿ Dibulla, Colombie (Forel)". Fits perfectly with the indicated type locality-area given by Forel (1899: 131): "Hab. [Habitat] Colombie, forêts du pied de la Sierra Nevada de Santa Marta, de Dibulla à Santa Marta."

***Cataglyphis savignyi* (Dufour, 1862)** {*Myrmecocystus viaticus desertorum* Forel, 1894} (Figs 3E, 4R) 2 **syntypes** (☿): "*M. viaticus* v. *desertorum* Gabès, Tunesien". Forel (1894b) mentioned Gabès as the locality of *C. desertorum*, described as n. v. [nouvelle variété]. However, *C. desertorum* is at present a junior synonym of *C. savignyi*.

***Lasius myops* Forel, 1894** (Figs 3D, 4Q) 2 **syntypes** (☿): "*L. myops* ☿ Forel Terni [Algeria; not Umbria as mentioned by Bloch 1940] 9.IV." One of the – originally three – ☿ is lost. The locality fits with the description (Forel, 1894a: 12), where he indicated: "Vallon près de Terni à plus de 1400 mètres d'élévation, sous les pierres, dans les lieux boisés." Furthermore, Forel's journey to Algeria was undertaken from 27th March to 19th April 1893, which corresponds with the given collection date (9th April).

Myrmicinae

***Cardiocondyla stambuloffii* Forel, 1892** (Figs 2C, 4J) 3 **syntypes** (☿): "*C. Stambuloffii* Forel ☿ Burgas [Bulgaria] 13. VIII". The type locality and the time fit perfectly with Forel (1892b), who gave Burgas, Anchialo and Sozopolis as localities and 13th to 16th August 1891 as time frame of his excursion.

***Crematogaster daisyi* Forel, 1901** (Figs 2F, 4M) 4 **paralectotypes** (3 ☿, 1 ♀) [*not 4 ♀ as mentioned by Bloch (1940)] : "*Cr. Daisyi* Forel ♀ type Sarawak 76. [1876 ?] Haviland [=Borneo]". As a lectotype and paralectotypes have been designated very recently by Hosoishi (2015), these formerly syntype specimens are paralectotypes according to article 73.2.2. of the ICZN (2016).

***C. ranavalonae* Forel, 1887** [*not *ranovalonae* (sic!) as cited by Bloch (1940)] (Figs 2E, 4L) 3 **syntypes** (☿): "*C. ranavalonis* [sic!] Forel ☿ Bois Ivondro p. [près] Tamatavé (Madagascar)". The locality corresponds perfectly with the one given by Forel (1887: 389).

***Messor lobicornis* Forel, 1894** (Figs 1D, 4D) 1 **syntype** (☿): "Terni [*Algeria, Tlemcen; not Umbrien as mentioned by Bloch (1940)] 9.IV". Forel (1894a: 32) gives the locality as follows: Caravansérail d'Aïn Ghoraba, près de Terni, dans une prairie. The label is identical with the one pictured from another syntype from the Forel collection of the MHNG on AntWeb (2016).

***Monomorium indicum* Forel, 1902** (Figs 1C, 4C) 3 **syntypes** (☿): "*M. Salomonis* r. [race] *indicum* ☿ Belgaum [=Belagavi, Karnataka, India] XXXI.12 (Wronghton)". Although Forel (1902: 213) does not give any localities under *indicum*, he mentions "Belgaum" and the collector (Wronghton) under the species described above in the text (which is *Monomorium dichroum* Forel, 1902). Therefore it seems logical that *M. indicum* was collected at the same locality as *M. dichroum,* and therefore the locality on the label is the type locality, and that the present specimens belong to the syntype series.

***M. smithii* Forel, 1892** (Figs 1F, 4F) 3 **syntypes** (☿): "*M. Smithii* ☿ Type Forel, Ashburton N. Zealand (Smith)". The label data of the syntypes fits perfectly with the locality given by Forel (1892a: 13), where he mentions "Ashburton, Neu-Seeland [New Zealand] (W. W. Smith)".

***Myrmica smythiesii* Forel, 1902** (Figs 1B, 4B) 2 **syntypes** (☿): "*M. Smythiesii* ☿ Forel Cas ha mere [Cashmere] Smythies H. [18]79." Forel (1902: 227) wrote in the description: "Diverses localités de l'Himalaya, de 7000' à 12000' [feet] (Smythies)." This includes the present indication. Furthermore the specimen was collected by Smythies himself while he travelled in the Himalayas.

***Pogonomyrmex mayri* Forel, 1899** (Figs 3A, 4N) 1 **paralectotype** (☿): "Sta. Martha [Santa Marta,

Colombia]". Johnson (2015) designated the lectotype and paralectotypes based on syntypes examined at the NHMW.

Solenopsis latro **Forel, 1894** (Figs 2D, 4K) 3 **syntypes** (☿): "*S. latro* ☿ Forel Souk Ahras [Algeria] chez *A*. [*Aphaenogaster*] *sardoa* (Forel)". In his description Forel (1894a: 21) gives the same data: "Souk Ahras (Algérie orientale), en nid double avec l'*Aphaenogaster sardoa*.".

Strongylognathus huberi **Forel, 1874** (Figs 1A, 4A) 2 **syntypes** (☿): "*S. huberi* ☿ Fully" [Switzerland, canton Valais]; 1 ♀ "*Str huberi* ♀ Type Fully 28.VIII". Forel (1874) mentioned that both males and females, were unknown to him when describing *S. huberi*. Therefore, the single female – although marked with the word "Type" – obviously does not belong to the syntype series. The label of the workers fits perfectly with further syntype specimens shown on AntWeb (2016).

Temnothorax algiricus trabutii **(Forel, 1894)** (Figs 1G, 4G) {*Leptothorax angustulus* r. [race] *trabutii* Forel, 1894} 2 **syntypes** (☿): "*L. angustulus* Nyl. ☿ r. [race] *Trabutii* [sic!] Forel Les Trembles Algérie". The given locality fits perfectly with the indications by Forel (1894a: 37-38): "Tas de bois et de racines d'arbustes à Tlemcen, Terni, les Trembles, Hammam bou Hadjar."

T. delaparti **(Forel, 1890)** {*Leptothorax*} (Figs 2A, 4H) 2 **syntypes** (☿): "L. de la Parti Forel ☿ Djebel Ozmor p. [près] Tebessa 1380 m. [Algeria] Forel". Fits perfectly with the description (Forel, 1890: LXXIV), where he stated: "Sommet du Djébel Ozmor (1380 mètres), près de Tebessa (Algérie)...".

T. oraniensis **(Forel, 1894)** {*Leptothorax nigrita* r. [race] *oraniensis*} (Figs 2B, 4I) 3 **syntypes** (☿): "*L. nigrita* r. [race] *oraniensis* Forel ☿ type Aïn Fezza Algérie (Forel)". Fits perfectly with the indications in the description (Forel, 1894a: 35): "Franchetti, Aïn Fezza, Tlemcen, en fourmilières fort populeuses, situées sous les pierres des prairies un peu, mais pas trop rocailleuses. A Aïn Fezza, j'en ai trouvé plusieurs fourmilières dans une prairie située à côté de la gare."

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Appendix 1. All 426 Formicidae from the Auguste Forel collection at the NMSO are listed with given locality, canton (for Swiss localities), states/nations, the year they were collected (if given), the numbers of specimens (m = males; q = queens; w = workers), the collector (leg.) and the presence of type specimens.

subfamily/genus/species	locality	canton	state	year	m	q	w	leg	types
Dolichoderinae									
Azteca aurita	Esperanza		Colombia		-	-	3	A. Forel	3 ancient syntypes (mixed type series)
Azteca delpini antillana			Santa Lucia		-	-	3	A. Forel	3 syntypes
Azteca instabilis	Buritaca (=Burithaka)		Colombia		-	-	2	A. Forel	
Azteca velox	Buritaca (=Burithaka)		Colombia		-	-	3	A. Forel	
Bothriomyrmex meridionalis	Mont Salève		France		-	-	3	A. Forel	
Dolichoderus bispinosus			Costa Rica		-	-	2	A. Forel	
Dolichoderus decollatus	Rio Frio		Colombia		-	-	2	A. Forel	
Dolichoderus quadripunctatus	Genève	GE	Switzerland		-	-	3	Frey-Gessner	
Dolichoderus quadripunctatus	Vaux-sur-Morges	VD	Switzerland		-	-	2	A. Forel	
Forelius maccooki	Austin (Texas)		USA		-	-	2		
Iridomyrmex purpureus	Mackay (Queensland)		Australia		-	-	2	A. Forel	
Liometopum microcephalum	Veselie (=Sare-Mussa)		Bulgaria		-	-	2	A. Forel	
Tapinoma erraticum	Vaux-sur-Morges	VD	Switzerland		-	-	2	A. Forel	
Tapinoma erraticum	Vaux-sur-Morges	VD	Switzerland		1	-	-	A. Forel	
Tapinoma erraticum	Mohammadia (=Perrégaux)		Algeria		2	-	-		
Tapinoma erraticum	Horgen	ZH	Switzerland		-	1	-	A. Forel	
Tapinoma nigerrimum	"Sudeuropa"				-	-	2	A. Forel	
Tapinoma nigerrimum	Sfax		Tunesia		-	1	-	A. Forel	
Dorylinae									
Aenictus fergusoni			India		-	-	2	A. Forel	
Dorylus fuscipennis	Aburi (Fisch)		Ghana		-	-	3		
Dorylus helvolus			Lesotho (Basutoland)		-	-	3	Wronghton	
Eciton carolinense	Faison, North Carolina		USA		-	-	3		
Eciton hamatum	Bonda		Colombia		-	-	3	A. Forel	
Labidus coecus	St. Catharina		Brasil		-	-	3		
Labidus praedator	Naranjo		Colombia		-	-	2	A. Forel	
Ectatomminae									
Ectatomma ruidum	Don Diego		Colombia		-	-	3	A. Forel	
Rhytidoponera metallica	#		Australia		-	-	1		
Formicinae									
Camponotus aethiops	Vaux-sur-Morges	VD	Switzerland		1	-	-	A. Forel	
Camponotus aethiops	Ajaccio (Korsika)		France		-	-	1	Bugnion	
Camponotus aethiops	Sofia		Bulgaria		1	-	2		
Camponotus alii	Djebel Ozmor, Tebessa		Algeria		-	-	3	A. Forel	3 syntypes
Camponotus bugnioni	Dibulla		Colombia		-	-	3	A. Forel	3 syntypes
Camponotus cruentatus	Montpellier (Hérault)		France		-	-	3	A. Forel	
Camponotus foreli	Mohammadia (=Perrégaux)		Algeria		-	-	3	A. Forel	

subfamily/genus/species	locality	canton	state	year	m	q	w	leg	types
Camponotus herculeanus	Uetliberg (Uto)	ZH	Switzerland		1	-	1	A. Forel	
Camponotus lateralis	Vaux-sur-Morges	VD	Switzerland		-	-	3	A. Forel	
Camponotus lateralis	Marseille, St. Loup		France		-	-	3	A. Forel	
Camponotus ligniperda			Switzerland		-	1	-	A. Forel	
Camponotus ligniperda	Vaux-sur-Morges	VD	Switzerland		-	-	1	A. Forel	
Camponotus ligniperda	Langnau am Albis	ZH	Switzerland		1		-	A. Forel	
Camponotus maculatus	Moronga (=Moyanga)		Madagascar		-	-	3		
Camponotus massiliensis	Marseille		France		-	-	3	A. Forel	
Camponotus micans	Soussa (=Susa)		Lybia		-	-	3	A. Forel	
Camponotus oasium	Ghadame (=Ghadamès)		Lybia		-	-	2	Ali	
Camponotus sylvaticus	Marseille, St. Loup		France		-	-	3		
Camponotus sylvaticus	Tebessa		Algeria		-	-	3	A. Forel	
Camponotus vagus			Bulgaria		-	1	-		
Camponotus vagus	Veselie (=Sare-Mussa)		Bulgaria		-	-	2		
Cataglyphis albicans	Soussa (=Susa)		Lybia		-	-	2	A. Forel	
Cataglyphis bicolor	Ghardimaon		Tunesia		-	-	2	A. Forel	
Cataglyphis bombycina	Ghadame (=Ghadamès)		Lybia		-	-	2	Ali	
Cataglyphis cursor	Montpellier (Hérault)		France		-	-	2	A. Forel	
Cataglyphis savignyi	Gabes		Tunesia		-	-	2	A. Forel	2 syntypes
Formica cinerea	Branson (Fully)	VS	Switzerland		-	-	2	A. Forel	
Formica exsecta	Mustad		Norway		-	-	2		
Formica exsecta	Mustad		Norway		-	1	-		
Formica exsectoides			USA		-	-	3	A. Forel	
Formica exsectoides	Worcester, Massachusetts		USA	1899	1	-	-		
Formica fusca(-group)	Stavanger		Norway		-	-	2	A. Forel	
Formica fusca(-group)	Zürich	ZH	Switzerland		-	1	-	A. Forel	
Formica gagates	Wien		Austria		-	-	2		
Formica integra	Washington		USA		-	-	3		
Formica pallidefulva	Morganton (State unknown)		USA		-	-	2	A. Forel	
Formica pratensis	Quarten, Quinten	SG	Switzerland		1	-	-		
Formica pratensis	Quarten, Quinten	SG	Switzerland		-	-	1		
Formica pratensis	München (Bayern)		Germany		-	-	2		
Formica pressilabris	Vaux-sur-Morges	VD	Switzerland		1	-	3	A. Forel	
Formica rufa(-group)	Horgen	ZH	Switzerland	1891	1	-	-		
Formica rufa(-group)	Fisibach	AG	Switzerland		-	-	2		
Formica rufa(-group)	Schliersee, Bayern		Germany		-	-	3		
Formica rufibarbis	Kashmir		India	1872	-	-	2		
Formica sanguinea	Rilo (Rila-mountains)		Bulgaria		-	1	-		
Formica sanguinea	Vallombrosa, Florenz		Italien		-	-	2		
Lasius alienus	Adelsberg (Krain)				-	-	2		
Lasius brunneus	Himalaja		Nepal	1860	-	-	2	Smythies	
Lasius emarginatus	Adelsberg (Krain)				-	-	3		
Lasius flavus	Fisibach	AG	Switzerland		-	-	3		
Lasius flavus	Fisibach	AG	Switzerland		-	1	-		

subfamily/genus/species	locality	canton	state	year	m	q	w	leg	types
Lasius fuliginosus	Drôme		France		-	-	2	A. Forel	
Lasius fuliginosus	Zürich	ZH	Switzerland		1	-	-		
Lasius mixtus	Morges	VD	Switzerland		-	1	-	A. Forel	
Lasius mixtus	Quarten, Quinten	SG	Switzerland		-	-	3	A. Forel	
Lasius myops	Terni		Algeria		-	-	2	A. Forel	2 syntypes
Lasius niger	Zürich	ZH	Switzerland		-	1	-	A. Forel	
Lasius niger	Madeira		Portugal		-	-	3	Schmitz	
Lasius umbratus	München (Bayern)		Germany		-	-	2		
Lasius umbratus	Zürich, Burghölzli	ZH	Switzerland		-	1	-	A. Forel	
Lasius umbratus	Zürich, Burghölzli	ZH	Switzerland		1	-	-	A. Forel	
Lepisiota frauenfeldi	Meschéria, Djebel Autar		Algeria		-	-	3	A. Forel	
Oecophylla smaragdina	Delagoa (Bay; =Maputo-Bucht)		Mozambique		-	-	2		
Polyergus rufescens	Vaux-sur-Morges	VD	Switzerland		1	1	3	A. Forel	
Polyrhachis abdominalis	Sumatra		Indonesia		-	-	1	Moesch	
Polyrhachis bihamata	Bingham		Burma		-	-	2		
Polyrhachis dives	Assam		India	1860	-	-	2	Smythies	
Proformica nasuta	Dubnitza		Bulgaria		-	-	1		
Myrmicinae									
Acromyrmex disciger	Blumenau		Brasil		-	-	2	Möller	
Acromyrmex niger	Rio de Janeiro		Brasil		-	-	3	Göldi	
Acromyrmex octospinosus	Don Diego		Colombia		-	-	2	A. Forel	
Aphaenogaster fulva	Baltimore		USA		-	1	2	A. Forel	
Aphaenogaster gibbosa	Souk Ahras		Algeria		-	-	3	A. Forel	
Aphaenogaster lamellidens	Faison, North Carolina		USA		-	-	2		
Aphaenogaster pallida	Les Trembles		Algeria		-	-	2	A. Forel	
Aphaenogaster sardoa	Mechroha (=Laverdure)		Algeria		-	-	2	A. Forel	
Aphaenogaster subterranea	Sliven		Bulgaria		-	-	1	A. Forel	
Aphaenogaster subterranea	Neapel, Capodimonte		Italien	1866	1	-	-	A. Forel	
Aphaenogaster swammerdami	Nosibé		Madagascar		-	-	1	Völtzkow	
Aphaenogaster tennesseensis	New Hampshire		USA		-	-	1		
Aphaenogaster testaceopilosa	Tunis		Tunesia		-	-	2	A. Forel	
Aphaenogaster treatae	AA Fundort unbekannt				-	-	2	A. Forel	
Apterostigma pilosum	Santa Catharina		Brasil		-	-	2	Möller	
Atta cephalotes			Costa Rica		-	-	3	Tonduz	
Atta laevigata	San Antonio		Colombia		-	-	3	A. Forel	
Atta sexdens			Colombia		-	-	2	A. Forel	
Atta tardigrada	Black Mountain, North Carolina		USA		-	-	1	A. Forel	
Cardiocondyla stambuloffii	Burgas		Bulgaria		-	-	3	A. Forel	3 syntypes
Carebara diversa			India		-	-	4		
Cataulacus latus	Kanara (SW India)		India		-	1	-	Wronghton	
Cephalotes atratus	Pará		Brasil		-	-	1	Göldi	
Cephalotes umbraculatus	Trinidad		Trinidad and Tobago		-	-	2	Urich	

subfamily/genus/species	locality	canton	state	year	m	q	w	leg	types
Crematogaster auberti	Tilimsen (Tlemcen)		Algeria		-	-	2	A. Forel	
Crematogaster daisyi	Sarawak, Borneo		Indonesia		-	1	3		4 paralectotypes
Crematogaster ranavalonae	Ivondro, Tamatavé		Madagascar		-	-	3		3 syntypes
Crematogaster rogenhoferi	Poona		India		-	-	3	Wronghton	
Crematogaster scutellaris	Souk Ahras		Algeria		-	-	3	A. Forel	
Crematogaster sordidula	Marseille		France		-	-	3	A. Forel	
Cyphomyrmex rimosus	Sao Vicente		Brasil		-	1	3		
Formicoxenus nitidulus	Ural (Gebirge)		Russia		-	-	1	A. Forel	
Goniomma hispanicum	Camargue		France		-	-	2	A. Forel	
Leptothorax acervorum	Trient, La Forclaz	VS	Switzerland		-	-	3	A. Forel	
Leptothorax muscorum	Schluderbach (=Carbonin), Südtirol		Austria		-	-	3	A. Forel	
Meranoplus bicolor			India	1877	-	-	2	Rogers	
Messor barbarus	Mohammadia (=Perrégaux)		Algeria		-	1	-	A. Forel	
Messor barbarus	Mechroha (=Laverdure)		Algeria		-	-	3	A. Forel	
Messor lobicornis	Terni		Algeria		-	-	1	A. Forel	1 syntype
Messor structor	Miramar, Balearen		Spain		-	1	2	A. Forel	
Monomorium antarcticum	Ashburton		New Zealand	1891	-	-	2	Smith	
Monomorium antarcticum	Nordinsel		New Zealand		-	-	3	Brooks	
Monomorium indicum	Belgaum (=Belagavi, Karnataka)		India		-	-	3	Wronghton	3 syntypes
Monomorium pharaonis	Blumenau		Brasil		-	-	3	A. Forel	
Monomorium smithii	Ashburton		New Zealand		-	-	3	Smith	3 syntypes
Myrmica lobicornis	Elinine Vrh, Rilo Dagh		Bulgaria		-	-	3		
Myrmica rubida	Quarten, Murg	SG	Switzerland		-	1	1		
Myrmica rubra	AA Fundort unbekannt				-	-	3		
Myrmica ruginodis	Rilo (Rila-mountains)		Bulgaria		-	-	2		
Myrmica rugulosa	Quarten, Murg	SG	Switzerland		-	-	3	A. Forel	
Myrmica scabrinodis	Vaux-sur-Morges	VD	Switzerland		2	1	2	A. Forel	
Myrmica smythiesii	Kashmir		India	1879	-	-	2	Smythies	2 syntypes
Myrmica sulcinodis	Schluderbach (=Carbonin), Südtirol		Austria		-	1	3		
Myrmicaria fodica	Chennai (=Madras)		India		-	-	2	Rothney	
Nylanderia steinheili	Barranquilla		Colombia		-	-	1	A. Forel	
Nylanderia steinheili	Rio Frio		Colombia		-	-	3	A. Forel	
Pheidole megacephala	Mana, Rio		Brasil		-	-	1	Göldi	
Pheidole megacephala	Madeira		Portugal		-	-	2	Schmitz	
Pheidole megacephala	Nosibé		Madagascar		-	1	-	Völtzkow	
Pheidole pallidula	Algier		Algeria		-	-	2	Moser	
Pheidole pallidula	Valle Onsernone	TI	Switzerland		-	1	2	A. Forel	
Pheidole pallidula	Ghadame (=Ghadamès)		Libya		1	-	-	A. Forel	
Pheidole pallidula	Tebessa		Algeria		-	-	2	A. Forel	
Pheidole praeusta	Rio Frio		Colombia		-	-	2	A. Forel	
Podomyrma gratiosa	Süd-Australia		Australia		-	-	1		
Podomyrma laevifrons	Queensland		Australia		-	-	1		

subfamily/genus/species	locality	canton	state	year	m	q	w	leg	types
Pogonomyrmex badius	Florida		USA		-	-	1		
Pogonomyrmex mayri	Santa Marta (=Martha)		Colombia		-	-	1		1 paralectotype
Pseudomyrmex gracilis	Tuis		Costa Rica	1868	-	-	1	Pillier	
Pseudomyrmex termitarius	San Antonio		Colombia		-	-	3	A. Forel	
Solenopsis fugax	Adelsberg, Erzgebirge (Sachsen)		Germany		-	-	3	A. Forel	
Solenopsis geminata	Odisha (=Orissa)		India	1864	-	-	3	A. Forel	
Solenopsis latro	Souk Ahras		Algeria		-	-	3	A. Forel	3 syntypes
Strongylognathus huberi	Fully	VS	Switzerland		-	1	-	A. Forel	
Strongylognathus huberi	Fully	VS	Switzerland		-	-	2	A. Forel	2 syntypes
Strongylognathus testaceus	Fribourg	FR	Switzerland		1	1	1		
Temnothorax affinis	Vaux-sur-Morges	VD	Switzerland		-	-	3	A. Forel	
Temnothorax algiricus trabutii	Les Trembles		Algeria		-	-	2	A. Forel	2 syntypes
Temnothorax delaparti	Djebel Ozmor, Tebessa		Algeria		-	-	2	A. Forel	2 syntypes
Temnothorax nigriceps	Elsass, Neuntelstein		Germany		-	-	3	A. Forel	
Temnothorax nylanderi	Sofia		Bulgaria		-	-	3	A. Forel	
Temnothorax oraniensis	Ain Fezza		Algeria		-	-	3	A. Forel	3 syntypes
Temnothorax recedens	Montpellier (Hérault), parc près de		France		-	-	2	A. Forel	
Temnothorax rogeri	Sliven		Bulgaria		-	-	1	A. Forel	
Temnothorax rottenbergii	Mechroha (=Laverdure)		Algeria		-	-	3	A. Forel	
Temnothorax tuberum	Mont Salève		France		-	-	2	A. Forel	
Temnothorax unifasciatus	Vaux-sur-Morges	VD	Switzerland		-	-	2	A. Forel	
Tetramorium caespitum	Wien Leopoldsberg		Austria		-	-	3	A. Forel	
Tetramorium sericeiventre	Imérima, Camboné		Madagascar		-	-	3	A. Forel	
Tetraponera rufonigra	Dharamsala, Himachal Pradesh		India		-	-	2	Fulton	
Trichomyrmex scabriceps	Surat, Siwalli (Ost-India)		India		-	-	3	Roger	
Xenomyrmex floridanus	Faison, North Carolina		USA		-	-	3	A. Forel	
Ponerinae									
Anochetus emarginatus	Calabasso		Colombia		-	-	3	A. Forel	
Anochetus inermis	Trinidad		Trinidad and Tobago		-	-	1		
Brachyponera lutea	Ost Zullusland, Wiederkehr		Australia		-	-	1		
Euponera stigma	Naranjo		Colombia		-	-	1	A. Forel	
Harpegnathos saltator cruentatus	Kanara (SW India)		India	1866	-	-	1	Bell	
Leptogenys processionalis	Ceylon (Sri Lanka)		India		-	-	3		
Odontomachus haematodus	Sumatra		Indonesia		-	-	3	Tritöchler	
Ponera coarctata			Europe		-	-	1		