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A well preserved fossil ant in Baltic amber of the enigmatic genus *Gesomyrmex* MAYR, 1868 (Hymenoptera: Formicidae)

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Abstract

The genus *Gesomyrmex* has been described by MAYR (1868) from a fossil ant in a piece of Baltic amber. Besides only a few other fossil species known of this genus, also 6 living species occurring in the Oriental region have been described. In addition one undescribed species is mentioned in the collection of the California Academy of Science. From the collection of the second author we investigated a fossil ant from Baltic amber and identified it as *Gesomyrmex* cf. *hoernesi* MAYR, 1868.

Keywords: Formicidae, Baltic amber, fossil ant, *Gesomyrmex*.

Samenvatting

Het genus *Gesomyrmex* werd door MAYR (1868) beschreven aan de hand van een fossiele mier in Baltisch amber. Naast een paar andere fossiele soorten, kennen we momenteel slechts 7 levende soorten die verspreid voorkomen in Zuidoost-Azië waarvan er 1 onbeschreven soort aanwezig is in de collectie van de California Academy of Science. Een fossiele mier in een stuk Baltisch amber uit de collectie van de tweede auteur, identificeerden we als *Gesomyrmex* cf. *hoernesi* MAYR, 1868.

Checklist of the extinct and extant *Gesomyrmex* species

- **fossilized forms:**

  Gesomyrmex expectans THÉOBALD, 1937. Oligocene, France
  Gesomyrmex hoernesi MAYR, 1868. Baltic Amber
  Gesomyrmex miegi THÉOBALD, 1937. Oligocene, France

- **living species (only the valid names)** (fig. 1)

  1 ***Gesomyrmex chaperi*** ANDRÉ, 1892.
  Type-locality: Borneo, valley of the Kapuas.
  2 ***Gesomyrmex howardi*** WHEELER, 1921.
  Type-locality: China, Canton
  3 ***Gesomyrmex kalshoveni*** WHEELER, 1929.
  Type-locality: Java.
  4 ***Gesomyrmex luzonensis*** WHEELER, 1916.
  Type-locality: Philippines, Luzon Island, Mt. Makiling.
  5 ***Gesomyrmex spatulatus*** COLE, 1949.
  Type-locality: India, Upper Assam, Jorhat.
  6 ***Gesomyrmex tobiasi*** DUBOVIKOFF, 2004.
  Type-locality: Vietnam, Hoa Binh province., Mai Chau district., 40 km west of Mai Chau, Pa Co.
  7 ***Gesomyrmex* th01**
  Type-locality: Thailand, Chiang Mai, Inthanon National Park, July 2006

Systematic account

Gustav MAYR (1868) has described the new genus *Gesomyrmex* from 19 specimen (18 workers and 1 male) of an ant embedded in a piece of Baltic amber and named the type *Gesomyrmex hoernesi*. In 1892 Ernest ANDRÉ received a few ants from M. Chaper collected in Borneo in the basin of the river Kapuas. He

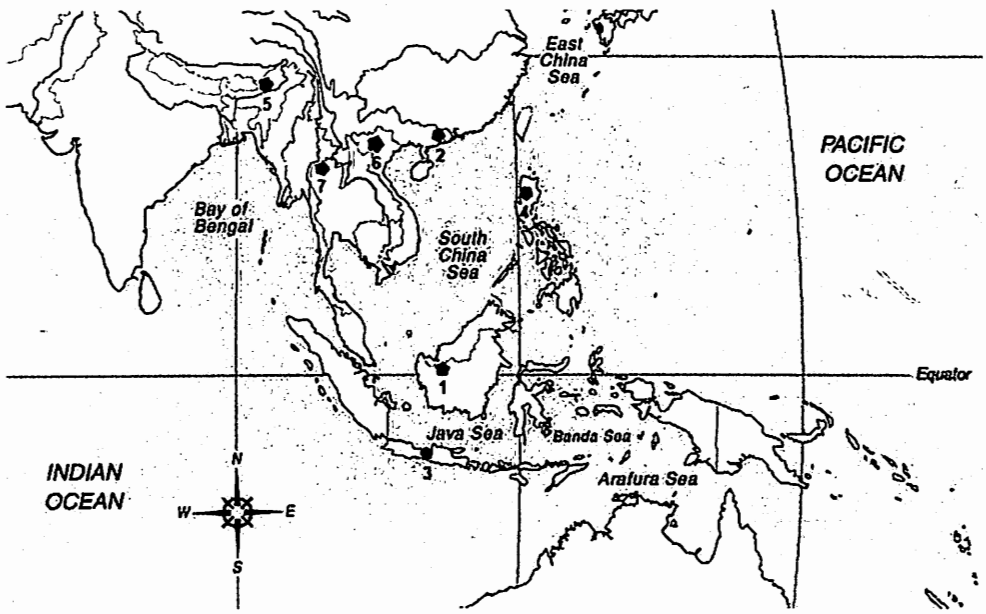

Fig. 1. Situation of the localities of extant *Gesomyrmex* species in the Oriental region.

described the first extant species of *Gesomyrmex* as *Gesomyrmex chaperi* and noticed a great resemblance with the fossil form of Mayr. From this same Bornean sample André described two other ants and erected the new genus *Dimorphomyrmex*. The two type specimens of *Dimorphomyrmex janeti* ANDRÉ, 1892 with a rectangular head were greater and had smaller eyes than *G. chaperi*. It was the examination of WHEELER (1929a) of a rather complete nest sample that demonstrated the polymorph character of the workers of *Gesomyrmex* species. Wheeler received 15 workers from Java, collected by L.G.K. Kalshoven in a teak forest and described the types as minor, media and major workers of *Gesomyrmex kalshoveni*. This leaded Wheeler to the conclusion that the two specimens of the new genus *Dimorphomyrmex* erected by E. André were the media and major castes of *Gesomyrmex chaperi*. However, WHEELER (1916) himself had assigned a winged female ant to the genus *Dimorphomyrmex* as *Dimorphomyrmex luzonensis* WHEELER, 1916 considering the possibility that his specimen was the female of André's species *Dimorphomyrmex janeti*. Previously WHEELER (1914) added a new species to this genus *Dimorphomyrmex* as *Dimorphomyrmex mayri* WHEELER, 1914 mentioning the differences with *Dimorphomyrmex theryi* EMERY, 1905. In 1921 WHEELER described *Gesomyrmex howardi* based on two workers collected in China.

In 1944 COLE (1949) collected 25 workers in India naming them *Gesomyrmex spatulatus*. He described his holotype from a major worker and defined 2 paratypes as major workers, 15 paratypes as intermediate workers and 7 specimens as minor workers. Recently DUBOVIKOFF (2004) added a new species *Gesomyrmex tobiasi* to the small checklist of this poorly known genus. He found a single female in the collections of the Laboratory of Insect Taxonomy of Zoological Institute RAS (ZIPS) which was sampled in the north of Vietnam. This is the second description on a single female. Wheelers holotype for *Gesomyrmex luzonensis* is also a female and was collected on the island Luzon of the Philippines. In July 2006 one specimen of an unknown species was collected by Y. Areeluck in Thailand nearby the Vachiratharn Falls. It is preserved in the collection of the California Academy of Science under the code CASENT0118772.

Remarks on the geographical distribution

We have shown that all the 7 extant species are known from the Oriental region. During a field survey in the Virachey National Park in Cambodia in October 2007, S. De Greef has found two nests of a *Gesomyrmex* species which he identified preliminary as *Gesomyrmex tobiasi*. In doing so he referred to the type-locality of this species in Vietnam 800 km to the north. In another sampling campaign unidentified specimens of the genus are collected in the Kinabalu Park in East Malaysia by A. Floren (http://www.antbase.de). It is very probably that

new species of *Geomyrmex* will be found in this geographical region. On the other hand it is quite remarkable that this concentration of extant species in the Oriental region is separated by the Eurasian continent from the Baltic region in North Europe, the locality of the extinct species. Especially the European continent has a strong tradition in myrmecological investigation making it nearly impossible that living species of *Gesomyrmex* have been overlooked. *Gesomyrmex* is not the only genus with this remarkable phenomenon. Other tropical ants as *Oecophylla* have been found in Baltic amber and MAYR (1868) remarked that there is a strong relationship between these fossil ants and the extant myrmecofauna of tropical Asia.

Decription of our sample

Our sample is a little piece of fossilized resin of *Pinites succinifer* (GÖPPERT, 1836) from the Upper Eocene Baltic amber forest with an estimated age of 46 million years b.p.. The fossil is semicircular with the greatest diameter of 7,5 mm and besides the described ant two other insects, a mosquito and a collembola are enclosed (fig. 2). The specimen is stored in the collection of the second author.

The amber-embedded ant (a minor worker) of the sample we investigated is well preserved but some details are rather obscure. There is only a single, distinct segment (the petiole) between the mesosoma and the gaster. The last abdominal segment shows us an acidoporus (fig. 3), a circular orifice surrounded by a fringe of setae, placing the specimen in the subfamily of the Formicinae. The antenna has 8 segments (fig. 4), the scapus followed by 7 funicular segments with a scapus not reaching the vertex of the head. The low number of antennal segments is rather unusual for species of the Formicinae and is only found in the genera *Gesomyrmex* and *Cladomyrma*. The difference between these two genera is that the antenna of the genus *Gesomyrmex* is stretched below the eye in its natural resting position (BOLTON, 1994) as observed by our sample.

The eyes are very large, reniform and are more approximated anteriorly. The anterior lobe of the large clypeus is projecting over the bases of the mandibles. The maxillae are very long with more than six acute teeth and the convex tips are bent downward and decussating when closed. The

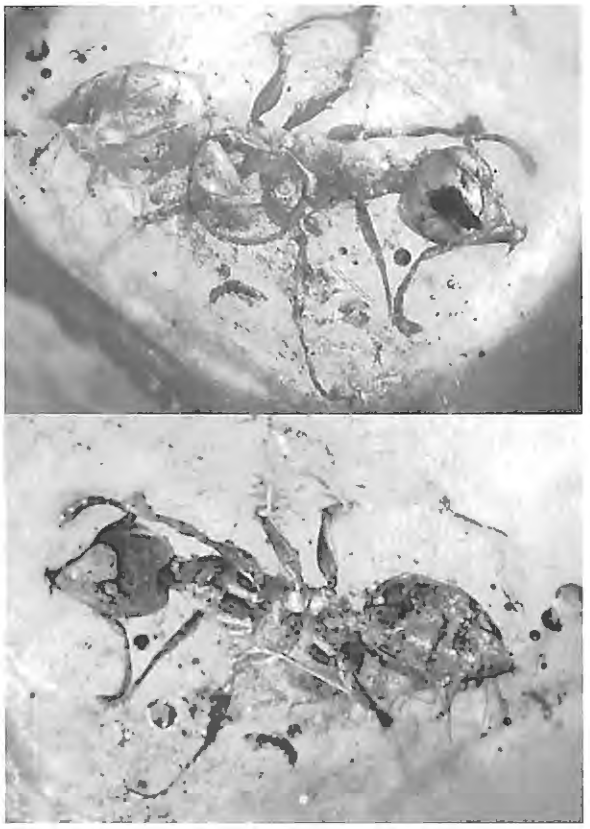

Fig. 2 Dorsal and ventral view of our fossilized *Gesomyrmex* specimen.

Fig. 3. Petiole and gaster with an acidoporus at the apex.

apical teeth of the mandibles are very long and acute. The apical segment of the maxillary palp is measuring 197 μm and is longer than the previous segment.

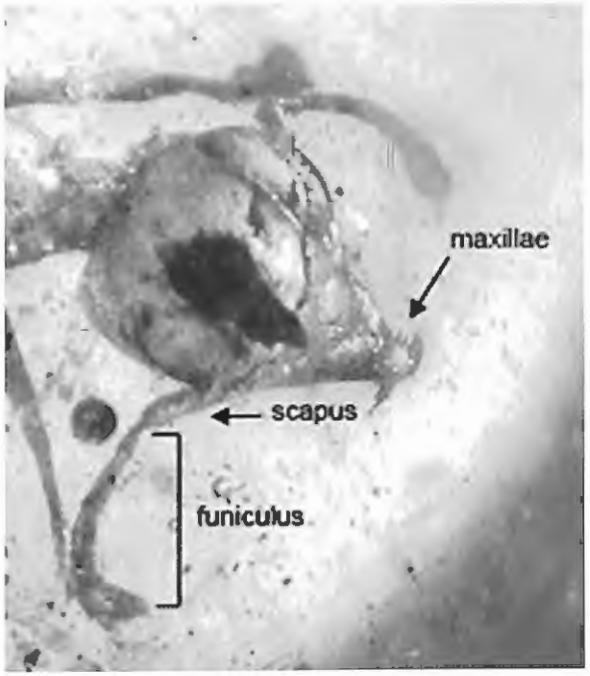

Fig. 4. Antenna with 8 segments and maxillae.

Morphometric characters:

All measurements are made with an Olympus SZX12 stereomicroscope equipped with a 1.2 x PF objective at magnifications of 96-216 times.

HW = 921 μm (maximum width of the head including the eyes); HL = 1.056 μm (head length from the apex of the clypeus to the posterior margin of the head); TW = 668 μm (thorax width measured from the ventral side of the mesosoma); SL = 540 μm (scapus length); EL = 576 μm (maximum length of the eye).

Total length approximately 5.000 μm.

Bibliographic remark

Consulting the appropriate literature, we found that WHEELER in his publication 'The ants of the Baltic Amber' (1914, p. 110) mentions the examination of a specimen of *Gesomyrmex hoernesi* found in the collections of 'the Brussels Museum'. Probably this collection item didn't had a reference number or at least it wasn't noticed by Wheeler. We supposed 'the Brussels Museum' must have been the present-day Royal Belgium Institute of Natural Sciences. As we could not find the specimen in the collection of the Department of Entomology, we consulted the colleagues of the Department of Palaeontology of the RBINS. Unfortunately, we couldn't find the sample mentioned by Wheeler and we assume it must be lost due to decomposition by time.

References

ANDRÉ E., 1892. – Voyage de M. Chaper à Bornéo. Catalogue des fourmis et description des espèces nouvelles. *Mem. Soc. Zool. France*, 5: 46-55.

BOLTON B., 1994. – Identification guide to the ant genera of the world. Harvard University Press, Cambridge, 222 pp.

BOLTON B., 1995. – A new general catalogue of the ants of the World. Harvard University Press, Cambridge, 504 pp.

BROWN W.L.Jr. & CARPENTER F. M., 1979. – A restudy of two ants from the Sicilian amber. *Psyche*, 85: 417-423.

COLE A.C., 1949. – A study of the genus *Gesomyrmex* Mayr, and a description of a species new to the genus. *Ann. Entomol. Soc. America*, 42: 71-76.

DUBOVIKOFF D.A., 2004. – A new species of the genus *Gesomyrmex* Mayr, 1868 (Hymenoptera: Formicidae) from Vietnam. *Proc. Russ. Entom. Soc. St. Petersburg*, vol. 75(1): 219-221.

EMERY C., 1891. – Le formiche dell'ambra Siciliana nel Museo Mineralogico dell'Universita di Bologna. *Mem. Accad. Sc. Bologna*, 5 (1): 141-165.

EMERY C., 1905. – Deux fourmis de l'ambre de la Baltique. *Bulletin de la Société Entomologique de France* 13: 187-189.

MAYR G. L., 1868. – Die Ameisen des baltischen Bernsteins. Beitr. Naturk. Preuss. Königl. Physik.-ökonom. Gesellschaft Königsberg, 1: 1-102.

THÉOBALD N., 1937. – Les Insectes Fossiles des Terrains Oligocènes de France. Nancy, 473 pp.

WHEELER W.M., 1914. – The ants of the Baltic Amber. Schrift. Physik.-ökonom. Gesellschaft Königsberg, 55: 1-142.

WHEELER W.M., 1916. – Four new and interesting ants from the mountains of Borneo and Luzon. *Proc. New England Zool. Club*, 6: 9-18.

WHEELER W.M., 1921. – Chinese ants collected by Prof. C. W. Howard. *Psyche*, 28: 110-115.

WHEELER W.M., 1929a. – The identity of the ant genera *Gesomyrmex* Mayr and *Dimorphomyrmex* Ernest André. *Psyche*, 36: 1-12.

WHEELER W.M., 1929b. – Note on *Gesomyrmex*. *Psyche*, 36: 91-92.

WHEELER W.M., 1930. – A second note on *Gesomyrmex*. *Psyche*, 37: 35-40.