



Inventory & Collection

Total protocol for understanding of biodiversity



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Chapter 9 IDENTIFICATION GUIDE TO THE ANT GENERA OF BORNEO

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Introduction

Ants are one of the most abundant and diverse animal groups in tropical ecosystems (Stork, 1987, 1991), and they function at many levels in these ecosystems - as predators and prey, as detritivores, mutualists, and herbivores (Hölldobler and Wilson, 1990). Thus, ants have the potential to yield more meaningful biodiversity data than many other organisms, such as plants, birds, and butterflies. Moreover, since most species have stationary, perennial nests with fairly restricted foraging ranges, ants have a potential role as indicators of environmental change. Because of the potential usefulness, inventory of ants has been viewed as an important task in tropical biodiversity and conservation studies (Agosti et al., 2000).

The most difficult part of ant inventory in tropical region is identification process. Inventory data are usually analyzed by relying on the presence or absence of species. However, identification of tropical ant specimens to species will be very difficult or impossible, because most groups of the ants have yet to be studied in detail. This difficulty makes the recognition of morphospecies a necessary part of inventory studies for ants (Agosti et al., 2000).

The identifying ants to genus-level are not impossible, because excellent identification-key to ant genera of the all parts of the world is available in Bolton (1994). Thus, for sorting ant specimens into morphospecies, they should be identified to genus (i.e., “ Ant species 1 and species 2” to “*Aenictus* sp. 1 and *Camponotus* sp.1”). This makes it easy to handle and analyze the data. Furthermore, ecological information, such as food habits, nest-site preference, colony size, etc., is provided to many genera (Hölldobler and Wilson, 1990). Thus identifying ants to genus-level can provide useful information on environmental monitoring, conservation evaluation, and ecological research.

However, the key of Bolton (1994) is technical, and requires some knowledge of taxonomic descriptions. For no-taxonomist, a more user-friendly and pictorial identification key to ant genera is need. Furthermore, for local inventory the regional identification key may be more convenient, because only a subset of the genera is found in each geographic region. In this chapter, therefore, I provide a pictorial identification key to Bornean ant genera.

Before attempting to identify an ant specimen, knowledge of the specimen mounting technique and the external anatomy must be confirmed. The chapter also provides instruction of the mounting techniques and glossary of ant morphology terms.

Outline of ant diversity in Borneo

The ant fauna of Borneo Island is very diverse and unique. The island may have 9 subfamilies, 94 genera and more than 1000 described species. Worldwide, there are 16 subfamilies, about 300 genera and about 15,000 described species of ants (Bolton 1995). Thus Borneo may have representatives of about 30% of its genera and about 7% of its species, though Borneo covers less than 0.2% of the earth's land surface. The 6 genera, including *Bregmatomyrma*, *Epelysidris*, *Ishakidris*, *Loweriella*, *Secostruma*, *Tetheamyrma*, may be endemic to Borneo. In Indo-Australian region, which include Malaysia, Philippines, Indonesia, New Guinea and Pacific Ocean islands, 22 endemic genera are found (Bolton, 1995). Thus, about 27% of them are Bornean ants.

Borneo has tropical rain forests with the richest plant diversity in the world. This is one of reason why the island has very diverse and unique ant fauna. Ant fauna in Borneo, especially in the canopy of tropical rain forests, has yet to be studied in detail. As the ant inventory are completed, many additional or new genera and species should be found from Borneo.

Notes on the keys

The keys provided here are designed to identify workers only. This is because workers are the most commonly encountered caste of ants in inventory. For sake of no-ant specialist user, I try to select and use easily observable characters in the keys. However, the use of a microscope is essential for identification of ants, because of their small size.

To make reliable identification, it is advisable to check additional information to confirm your identification. The additional information includes the diagnostic characters and biological information of taxonomic group, and the known distribution of the group. The book of Hölldobler and Wilson (1990), and Social insect Web-site (http://research.amnh.org/entomology/social_insects/) can help you to search such information. This chapter also provide genus list of Bornean ants, with their taxonomic references and biological data.

In some case specimen may not identified certainly. When this happens, you try to use Bolton's key (1994). The illustrations provided here should help you to understand the taxonomic descriptions in the key.

Preparation and Preservation of ant specimens

The preparation of ant specimen is more important than the collection of specimen in the field. Big size organisms, like mammal and birds, can be identified in the field. However, small organisms, like ants, are needed to preserve and prepare for identification in the laboratory. The use of good preservation and preparation techniques serves to facilitate the identification of species and improves research value of specimen. Preparation and preservation techniques of ant specimens, here, are outlined.

1) Pinning Specimens

Insect specimens are mounted on pins so that they may be handled and examined with the greatest convenience.

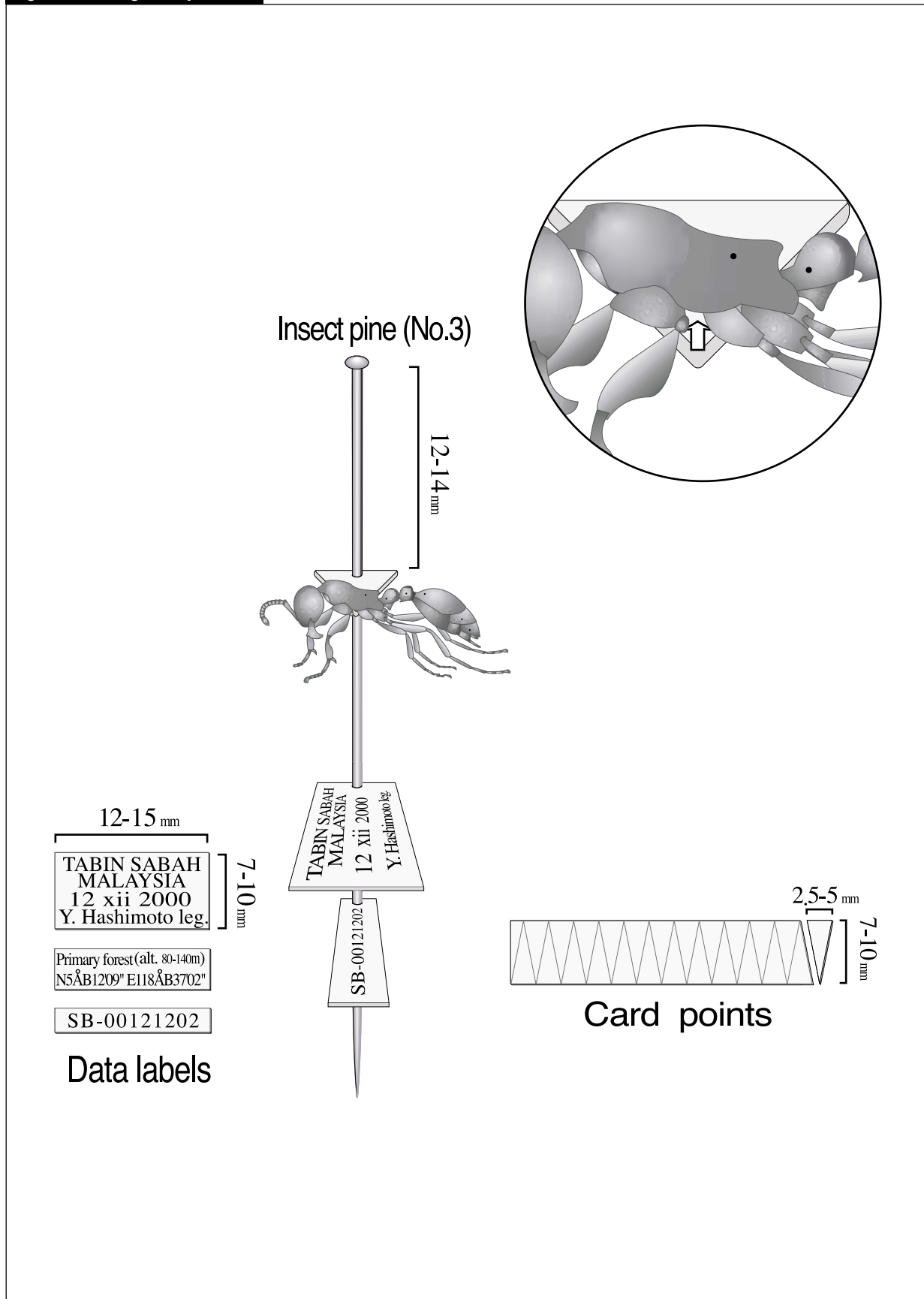
Therefore, for identification and taxonomic study, pinning specimens should be used. Fig. 1 shows typical tools needed to make pinning specimens.



Fig. 1 Commonly used specimen mounting tools include a pinning block, forcep, pins, points, glue.

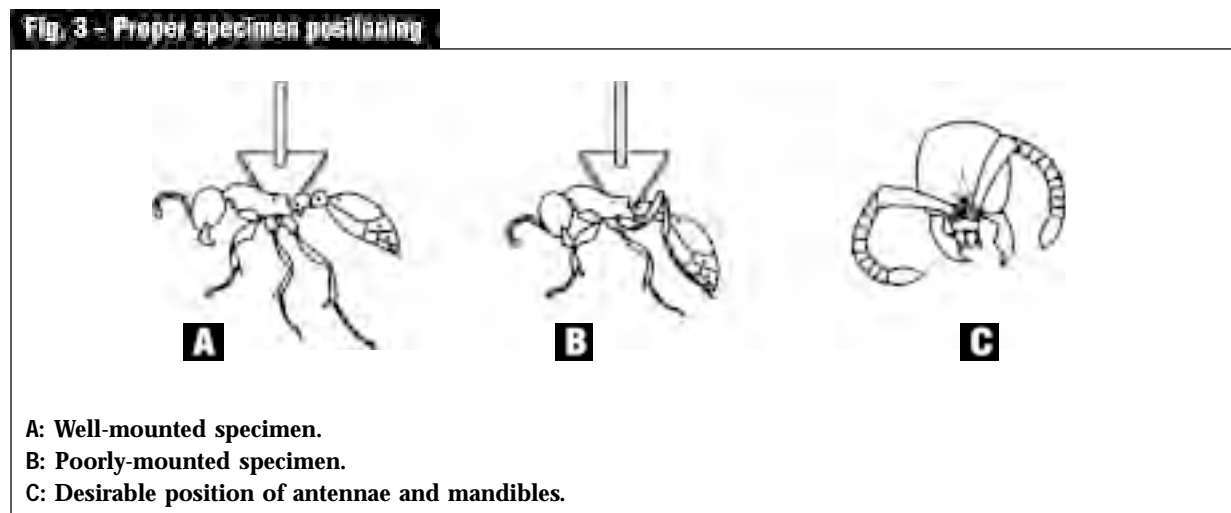
Ants are usually too small to be pinned directly, and so should be pinned as double mounts, i.e., the specimen is glued to a card point and the point is pinned through the broad end with a No. 3 insect pin (Fig. 2). Card points are slender little triangles of stiff paper, which are cut from a strip of paper (they should be no more than 10 mm long and 5 mm wide). The choice of good quality paper for card points is important to prevent the specimen from working loose and rotating on the pin. To mount the specimens on card points, white glue is used commonly. Touch the tip of the point to the glue, and then the point is attached to the

Fig. 2 - Pinning ant specimen



platform formed by the middle and hind coxae, inserting the point from the right side. Only a small amount of glue should be used, since excessive glue may obscure certain structures necessary for identification. The height of the card point on the pin will depend somewhat on specimen size, but enough of the pin should always be exposed above it to be grasped without the fingers touching and possibly damaging the specimen. Good height may be obtained by using the pinning block.

Fig. 3 illustrates some right and wrong examples for mounting specimen. In well-mounted specimen, the side of the alitrunk, the dorsal profile, and the dorsal and ventral margins of the petiole are clearly visible (Fig. 3A). Otherwise, in poorly-mounted specimen, the legs are projecting upward, obscuring the dorsal profile and the petiole (Fig. 3B). In ants, the area around the alitrunk and petiole bear many identification characters, and therefore the parts of the body should be free for easy examination. The head is also important area for identification. It is advisable to push upward a pair of antennae, so that they do not obscure the head (Fig. 3C). In many genera, the palp formula and mandibular dentition are diagnostic characters. One or more specimens in a series should have the mandibles opened and the mouthparts everted prior to mounting. It is somewhat troublesome and time-consuming work to make good mounted specimens. However, if any identification key is to be used with some hope of success, specimens must be mounted in the way that the characters needed for identification are clearly visible.



2) Labeling

Specimens without data labels have no scientific value. Therefore, during preparation and mounting, specimens should bear temporary data labels, and any time a sample is subdivided, the label must be copied so that every specimen continues to be accompanied by the data. Here, the important points for making the labels are described.

A) Paper and Size of Label

The paper used for making labels should be thick enough so that the labels remain flat and do not rotate loosely on the pin. Label size of insect specimen may depend on the size of the insect on a pin. An advantage of a label that exceeds the size of the insect is that if the specimen is accidentally dropped, the label may keep the insect from being damaged. However, for ant specimens, it is proper that the size should be no more than 12 mm long and 3 mm wide (Fig. 2), because most ants are very small and large labels are inconvenient to handle and examine specimen. If more data are included, more than one label should be used.

B) Label printing

The style and technique of label printing or writing may vary from one worker to another. Recently, computer-generated labels printed by laser printers become increasingly common. This way has made it easier to produce labels in very small font sizes. And word processor and database software that help in generating this kind of label is widely available. However, toner of laser printer may deteriorate with age so that laser printed label will peeled off the toner finally. Methods of computer-generated labels are subject to improvement. The best labels may still be professionally printed labels.

C) Label Data

Collection locality, date (day, month and year), and collector name is indispensable specimen data. These data should be printed on a label (Fig. 2). Furthermore, since Global Positioning System (GPS) is available now, it is recommendable to put latitude and longitude on a label in addition to the primary locality data. For ants, information about collecting or nesting site, such as soil, leaf-letter and tree, are of great importance for identification purposes, and so usually recorded on additional labels. When a colony can be collected, it is advisable that colony code-number is assigned to the specimens belonged to the colony. This way ensures to refer combination with different castes from same colony.

D) Placing the Labels

The pin is inserted through the center of the right side of the label (Fig. 2), with the long axis of the label oriented in the same direction as the card point.

Wet specimen - Liquid Preservation

In ants, liquid preservation is well used for duplication specimen storage, and also temporary storage of ant specimens, until the specimen can be mounted. Most commonly, 70-80 % ethanol is used as preservation fluids. Fig. 4 shows typical tools needed to preserve wet-specimens. The specimens are kept in a small vial and then the vials are kept in a jar. Each vial should be individually labeled with complete collection data. Labels may also be placed on the outside of the jars to indicate the enclosed contents. Special care should be taken with labels for wet-specimens. Typewritten labels and laser printed labels are generally unacceptable, since such labels cannot withstand the constant exposure to the alcohol. The best may be the labels writing with soft lead pencil or India inks. Each vial and jar should be filled with alcohol to the top. And, the jars should be checked periodically to prevent alcohol evaporation.

Preservation for Molecular and Chemotaxonomic studies

In ants, specimens for molecular work should be collected in absolute (100%) ethyl alcohol. It is best that specimens are thoroughly dehydrated by changing the alcohol at least a couple of time before the specimens are stored for any length of time. It is also advisable to keep the specimens in refrigerator. For chemotaxonomic analysis of body-surface wax, ant specimen should be kept in less than 70% ethyl alcohol, to prevent dissolution of the wax into preservation fluid.

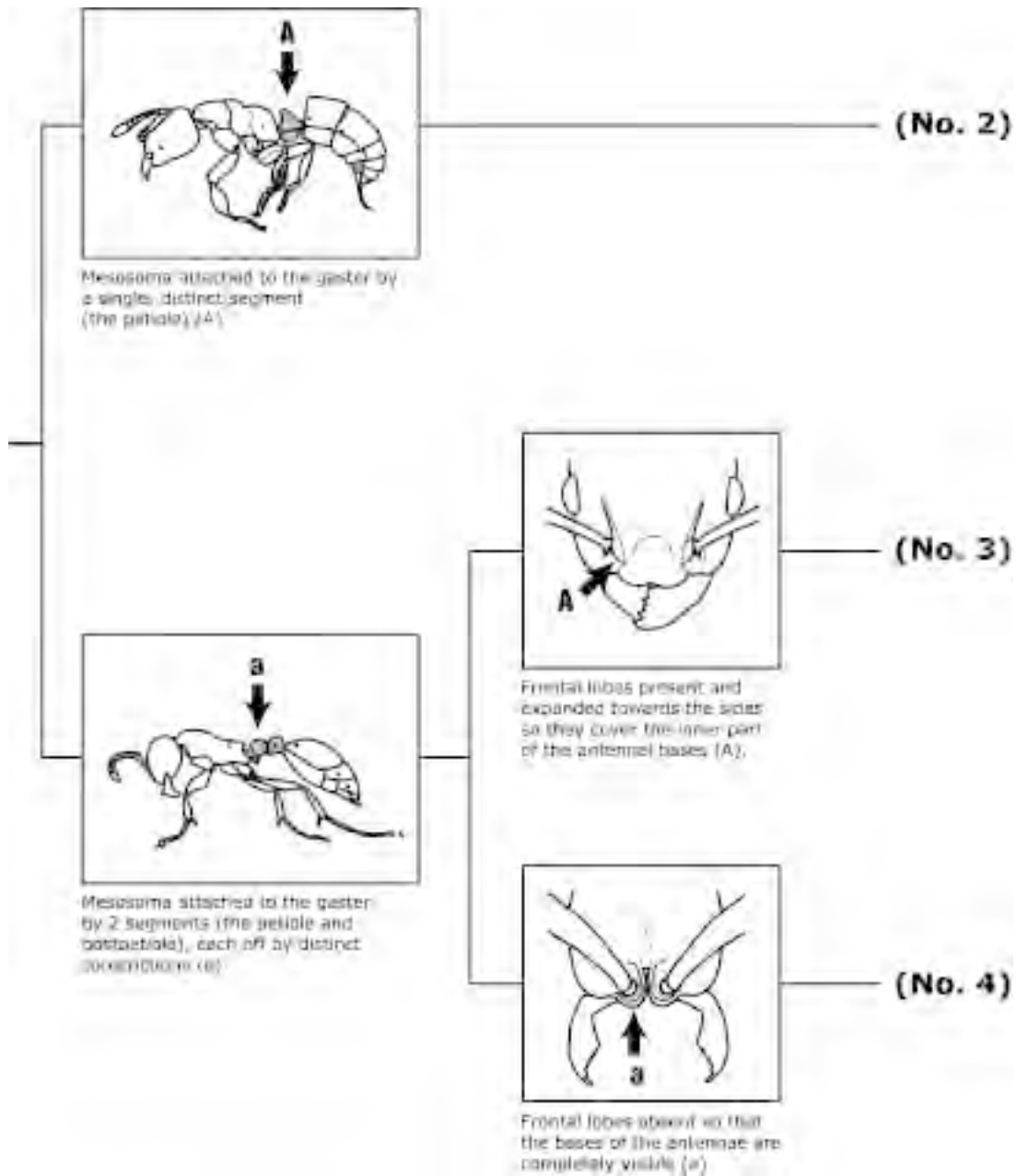


Wet specimen.

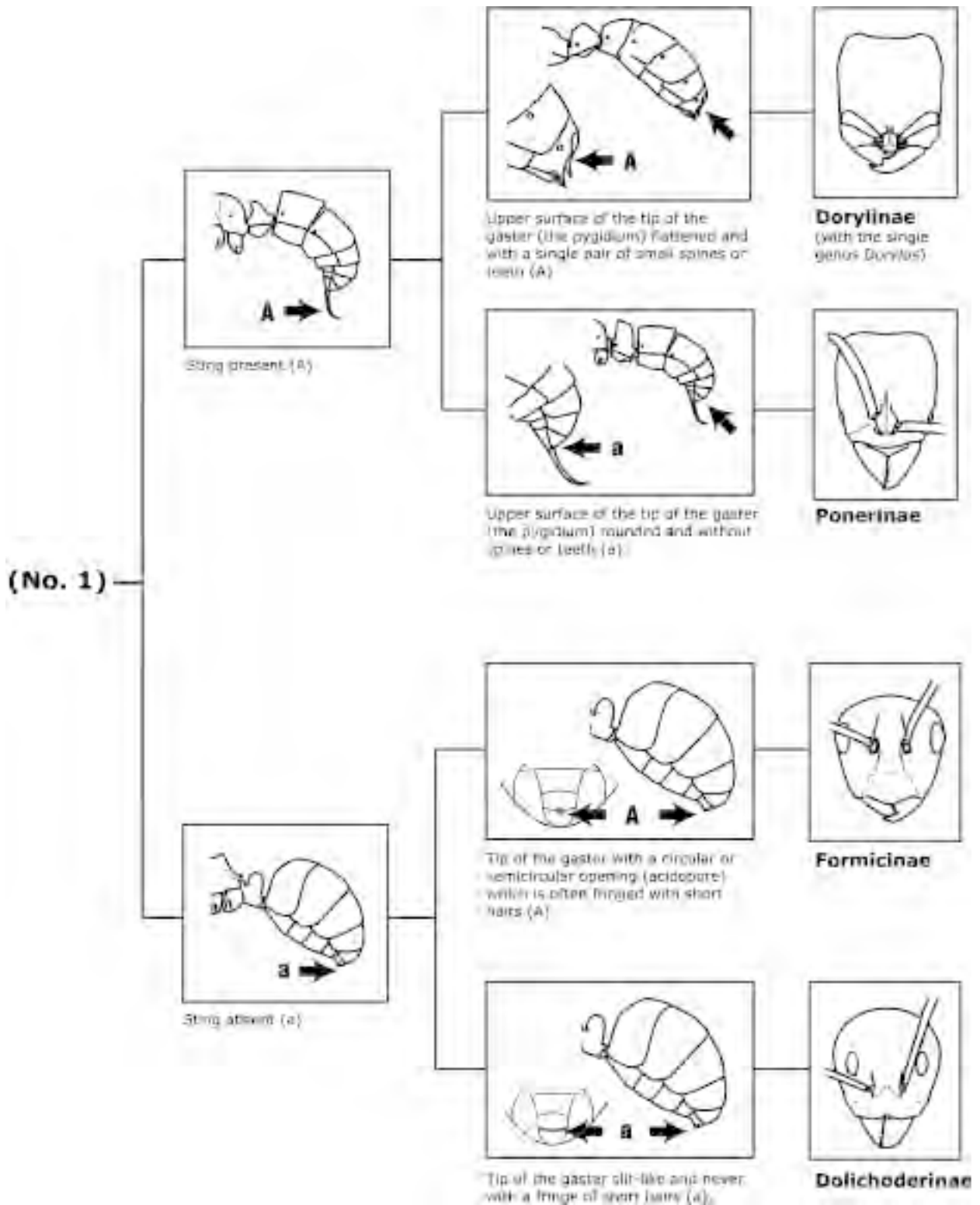
References

- Agosti, D., J. Majer, L. Alonso, and T. R. Schultz (eds.) (2000) *Ants: Standard methods for measuring and monitoring biodiversity*. 280 pp. Smithsonian Institution Press.
- Bolton, B.O.(1994) *Identification guide to the ant genera of the world*. Harvard University Press, Cambridge, MA. 222 pp.
- Bolton, B. (1995) *A new general catalogue of the ants of the world*. Harvard University Press, Cambridge, MA. 504 pp.
- Hölldobler, B. and Wilson, E. O. (1990) *The Ants*. 733 pp. Belknap Press of Harvard University, Cambridge, MA.
- Stork, N. E. (1987) Guild structure of arthropod fauna of Bornean lowland rain forest trees. *Ecol. Entomol.*, 12: 69-80
- Stork, N. E. (1991) The composition of arthropod fauna of Bornean lowland rain forest trees. *J. Trop. Ecol.* 7:161-180

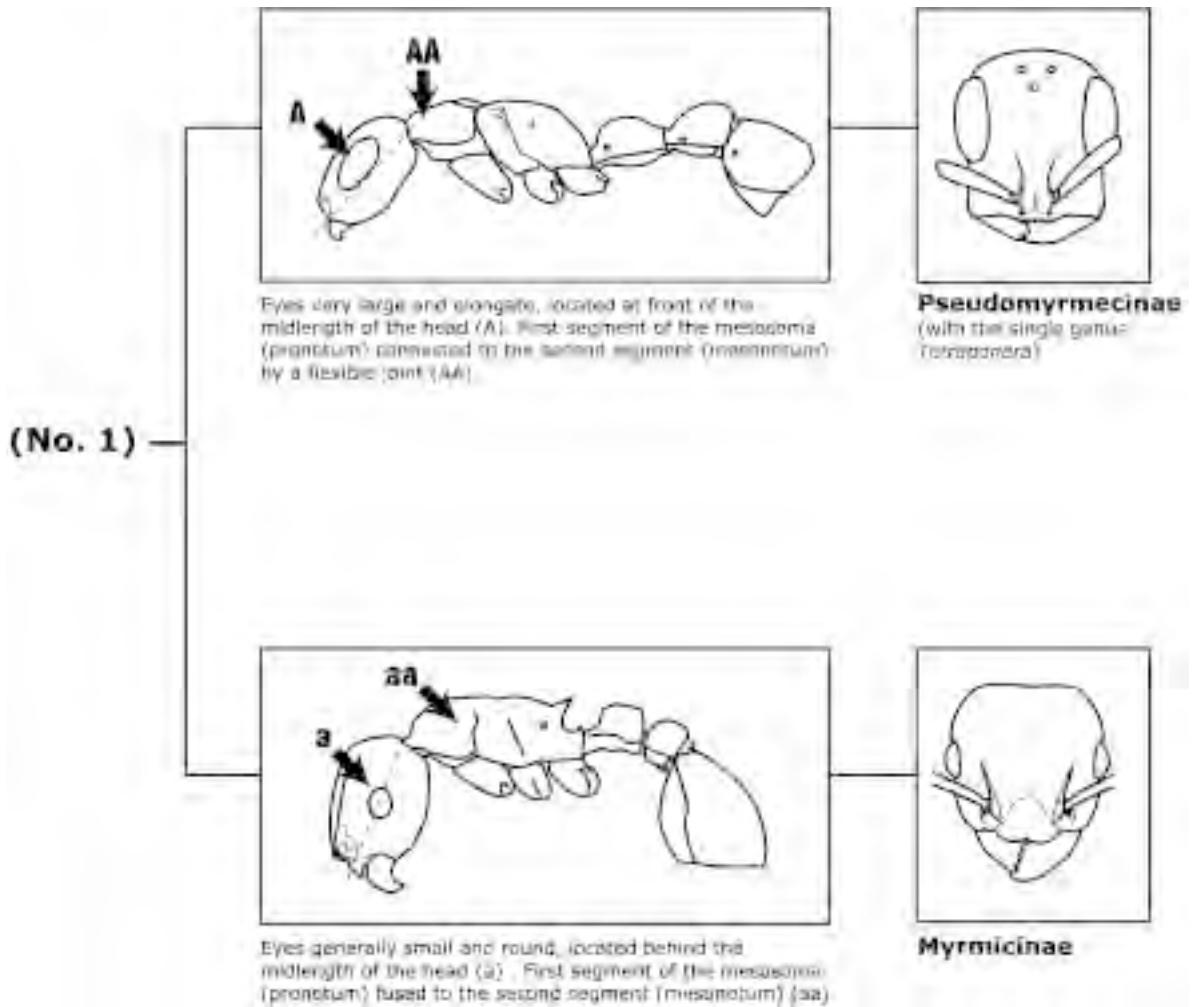
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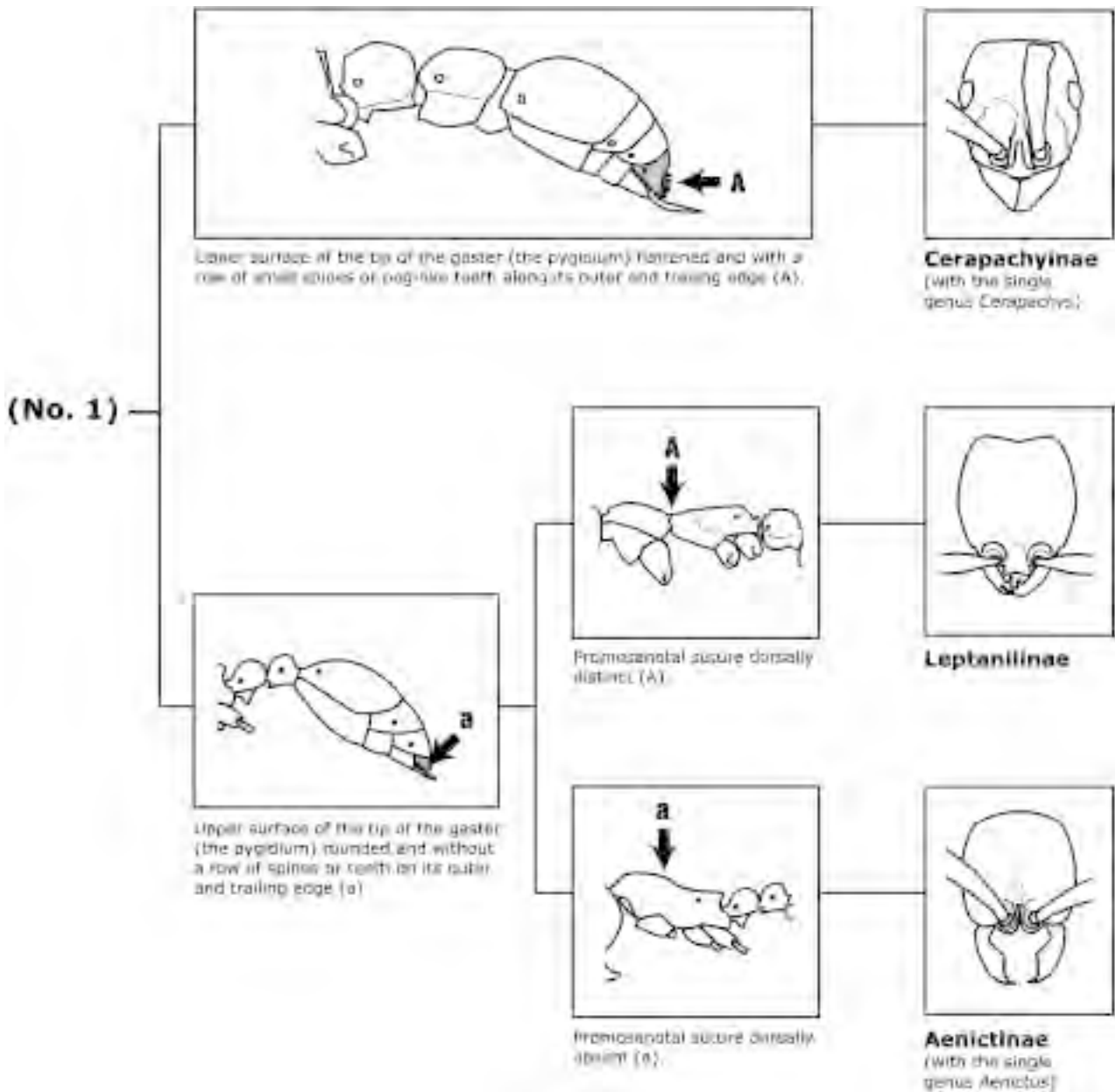
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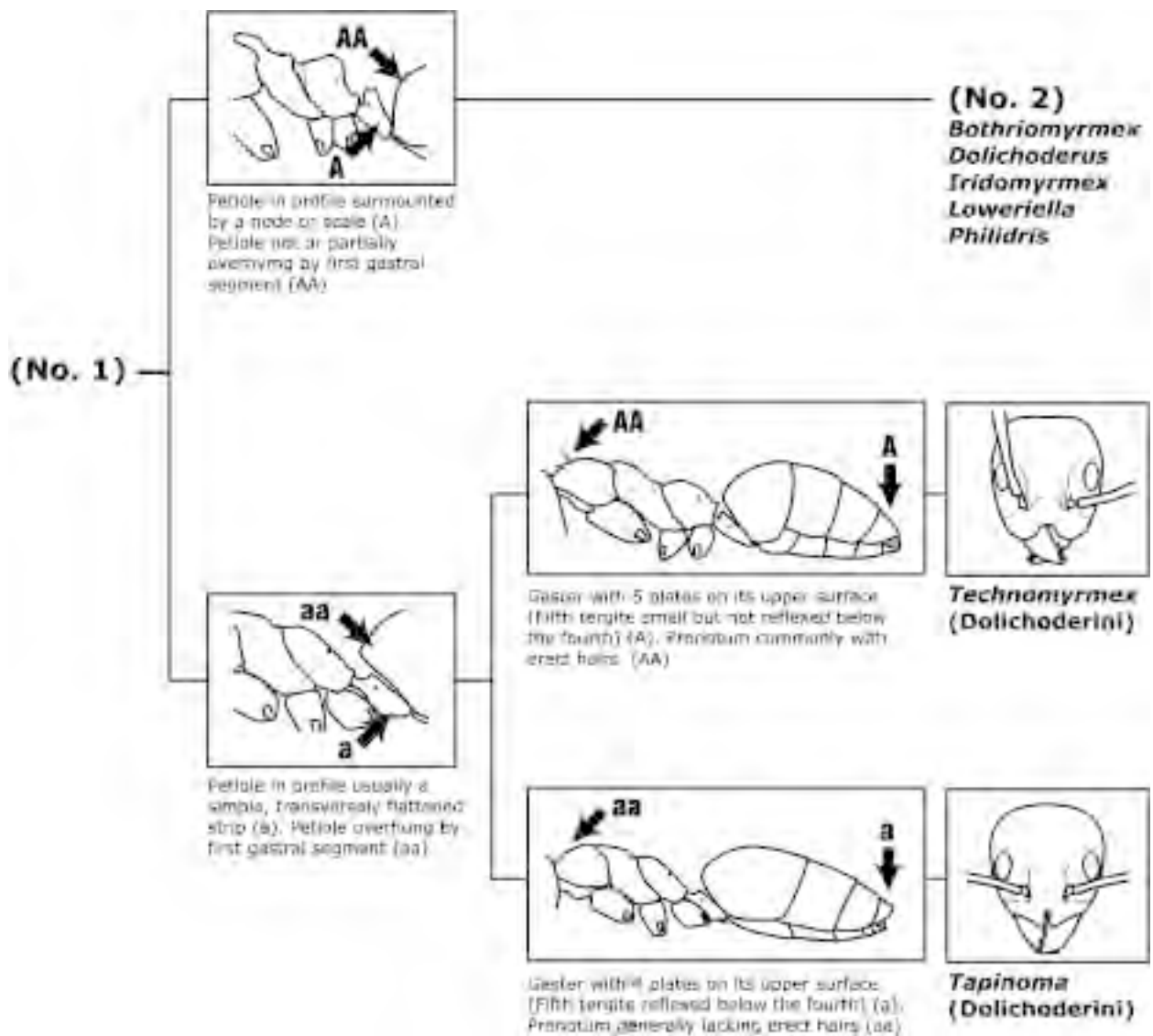
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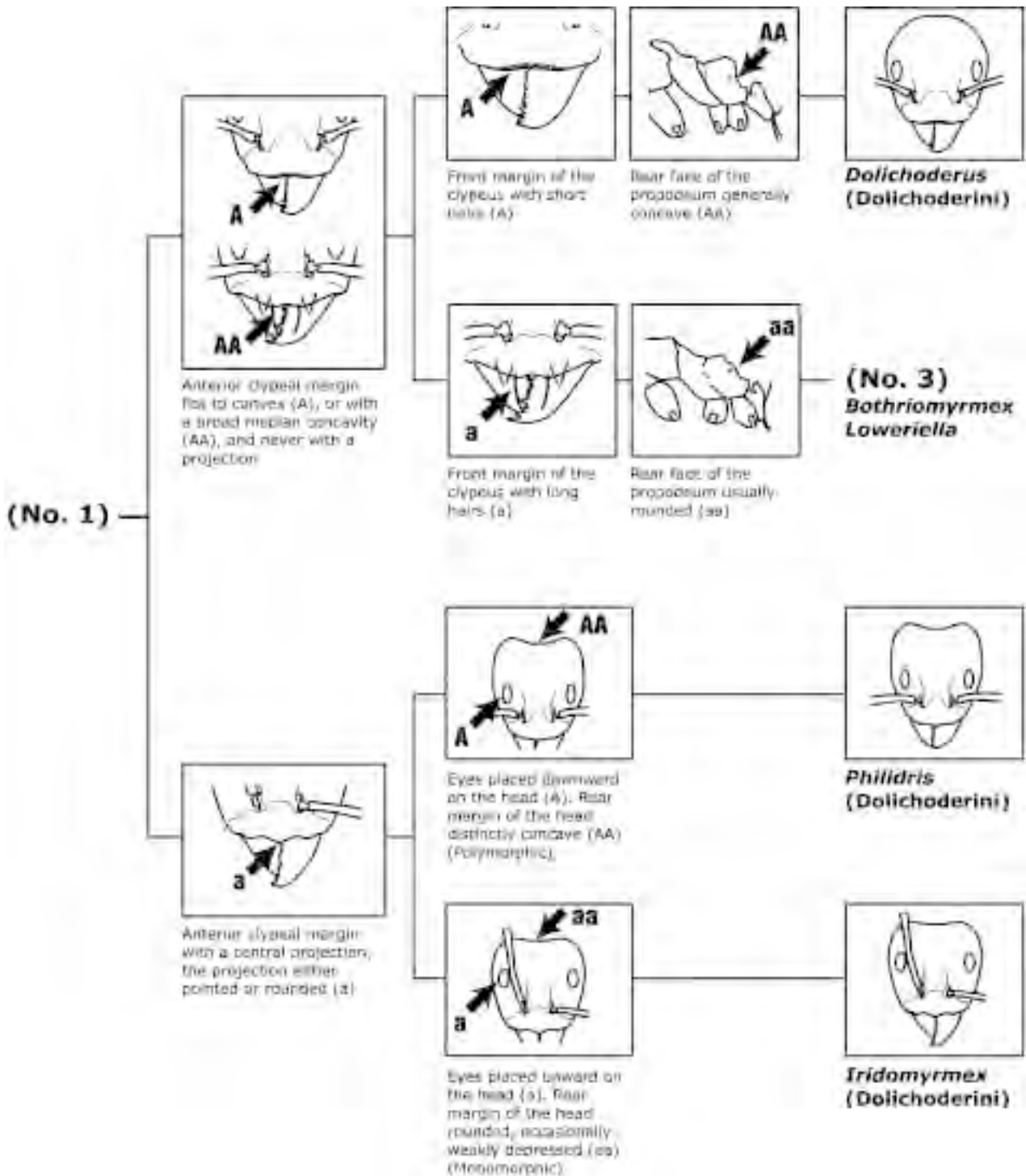
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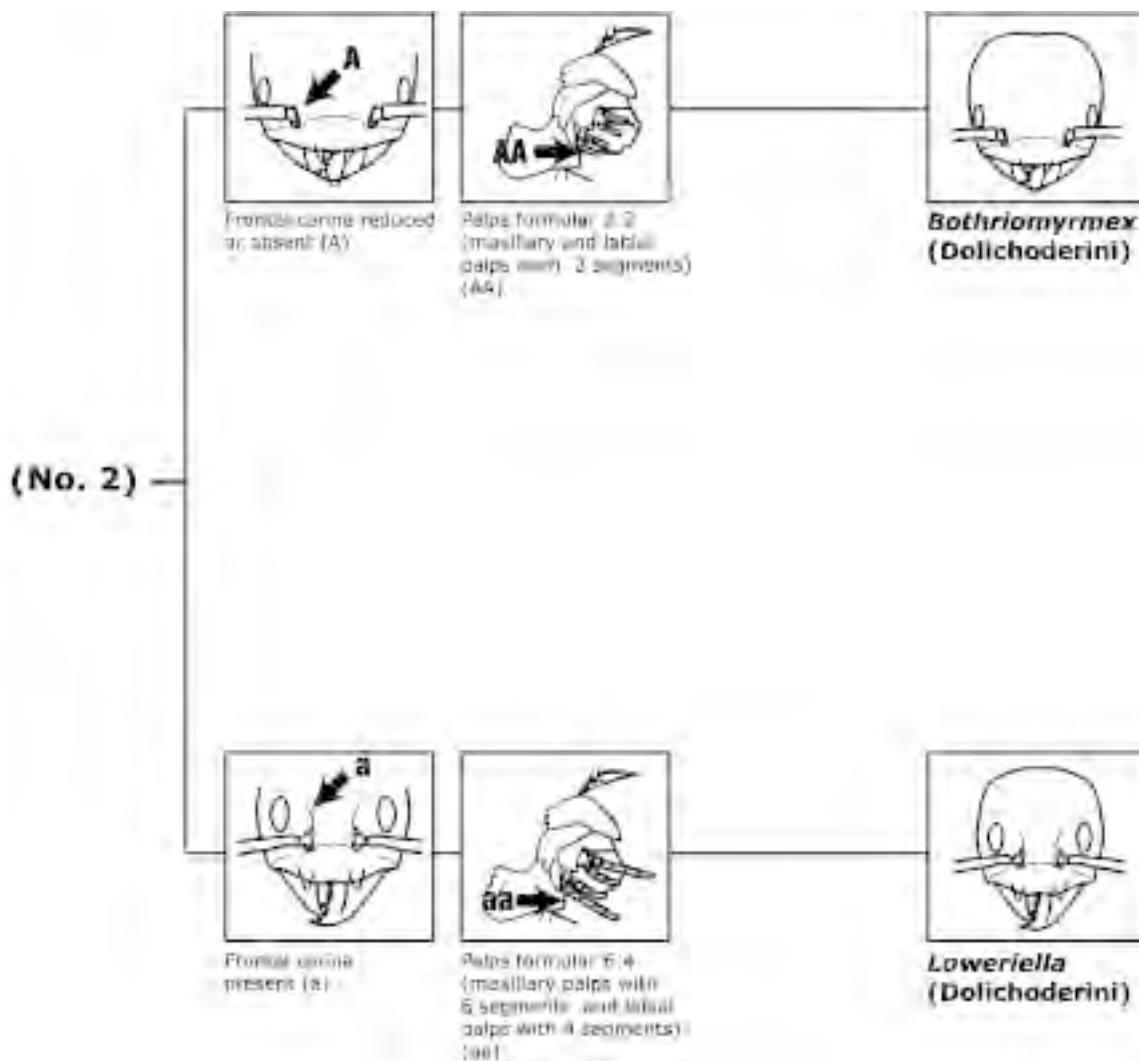
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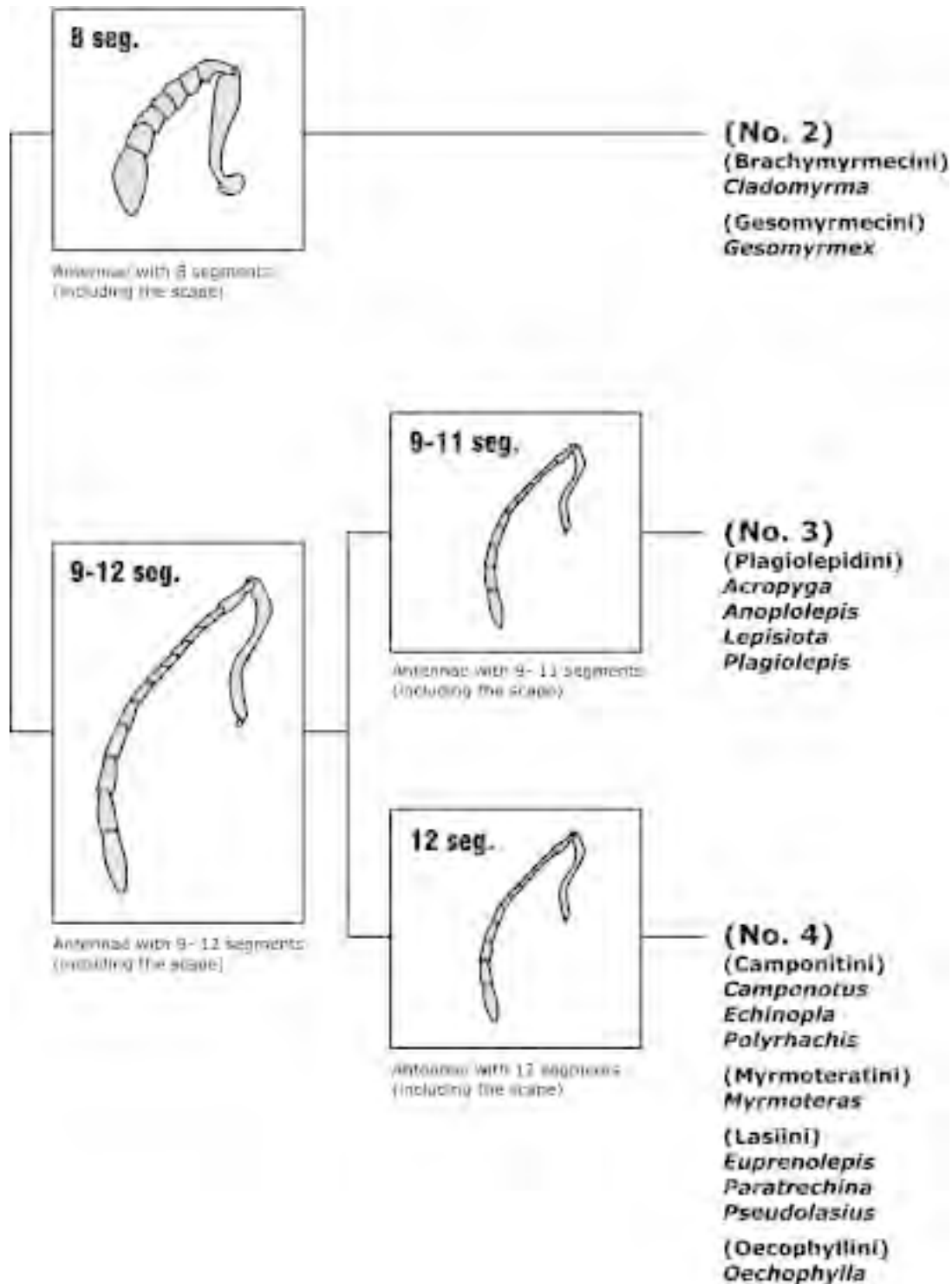
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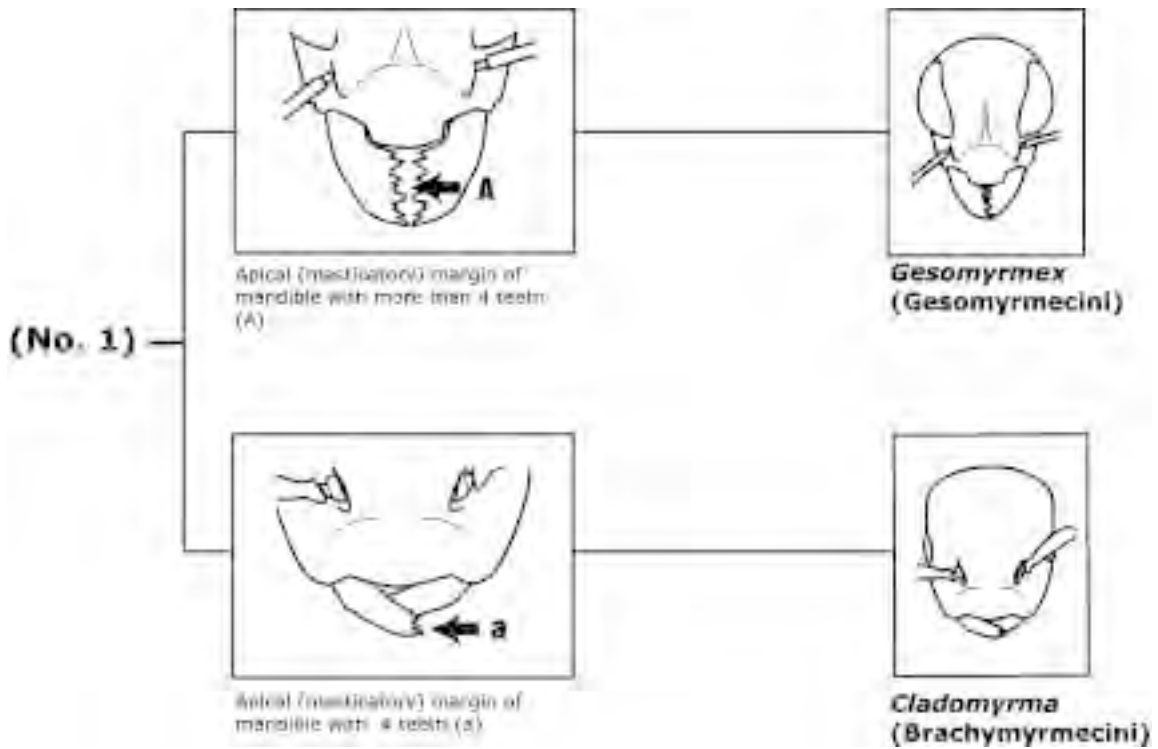
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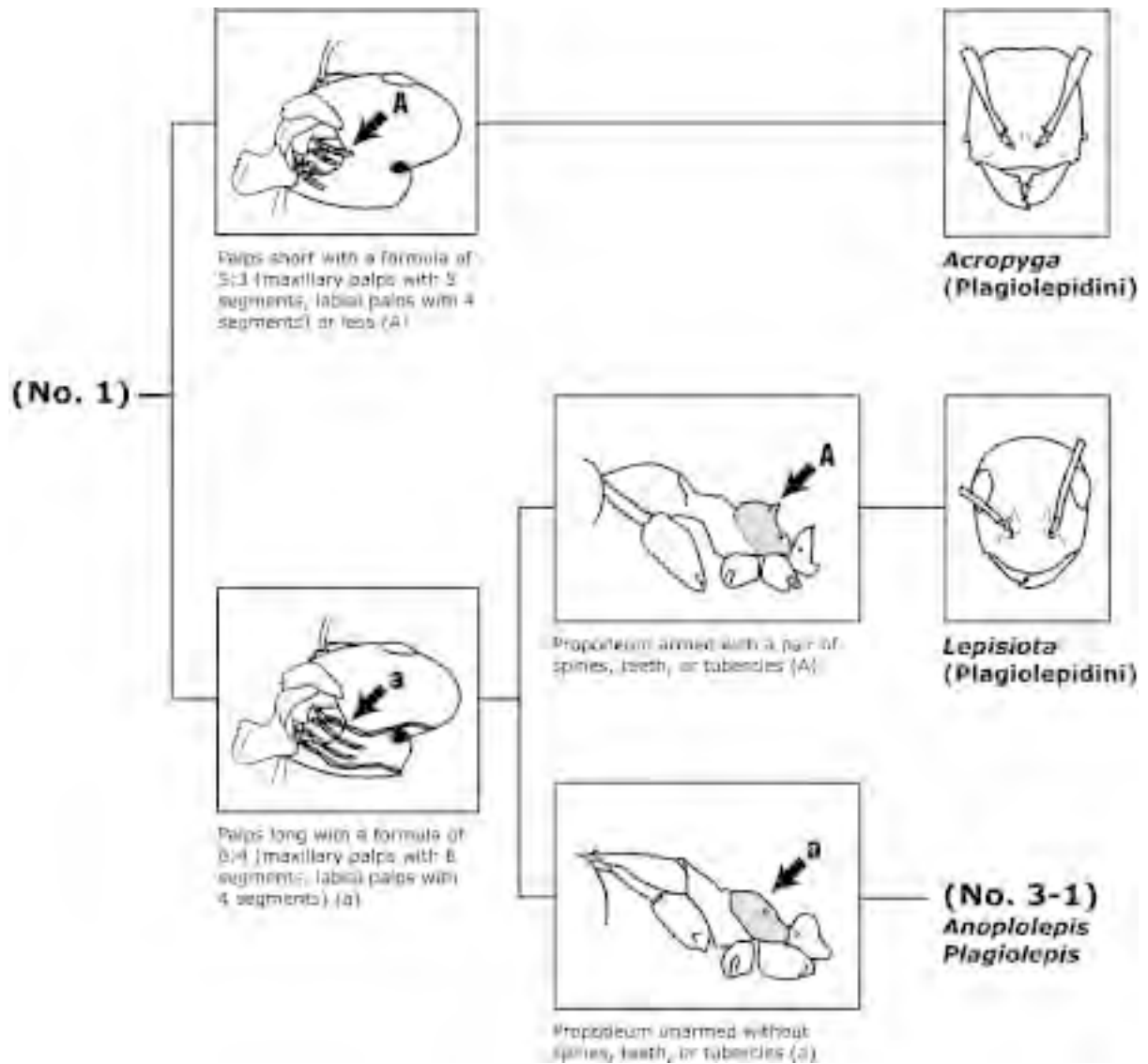
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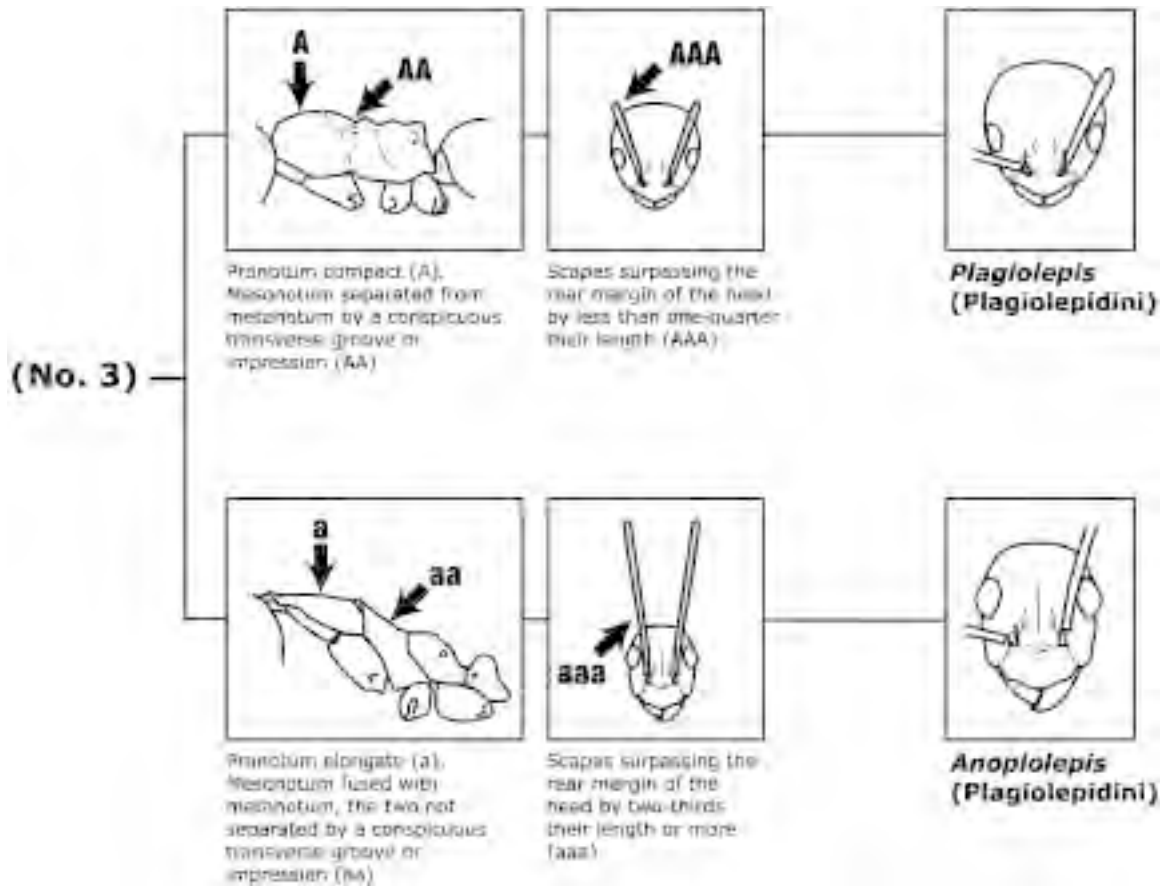
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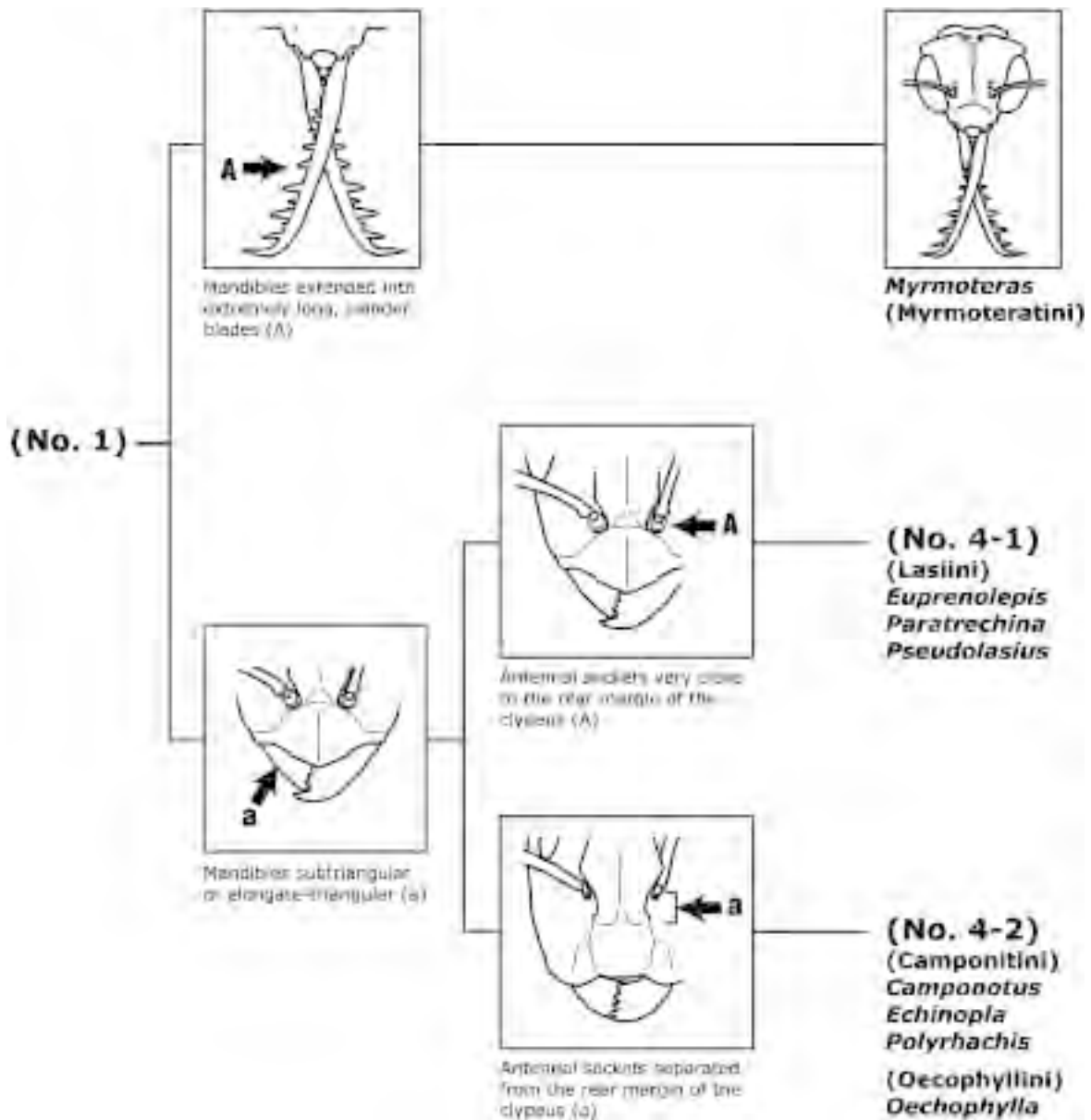
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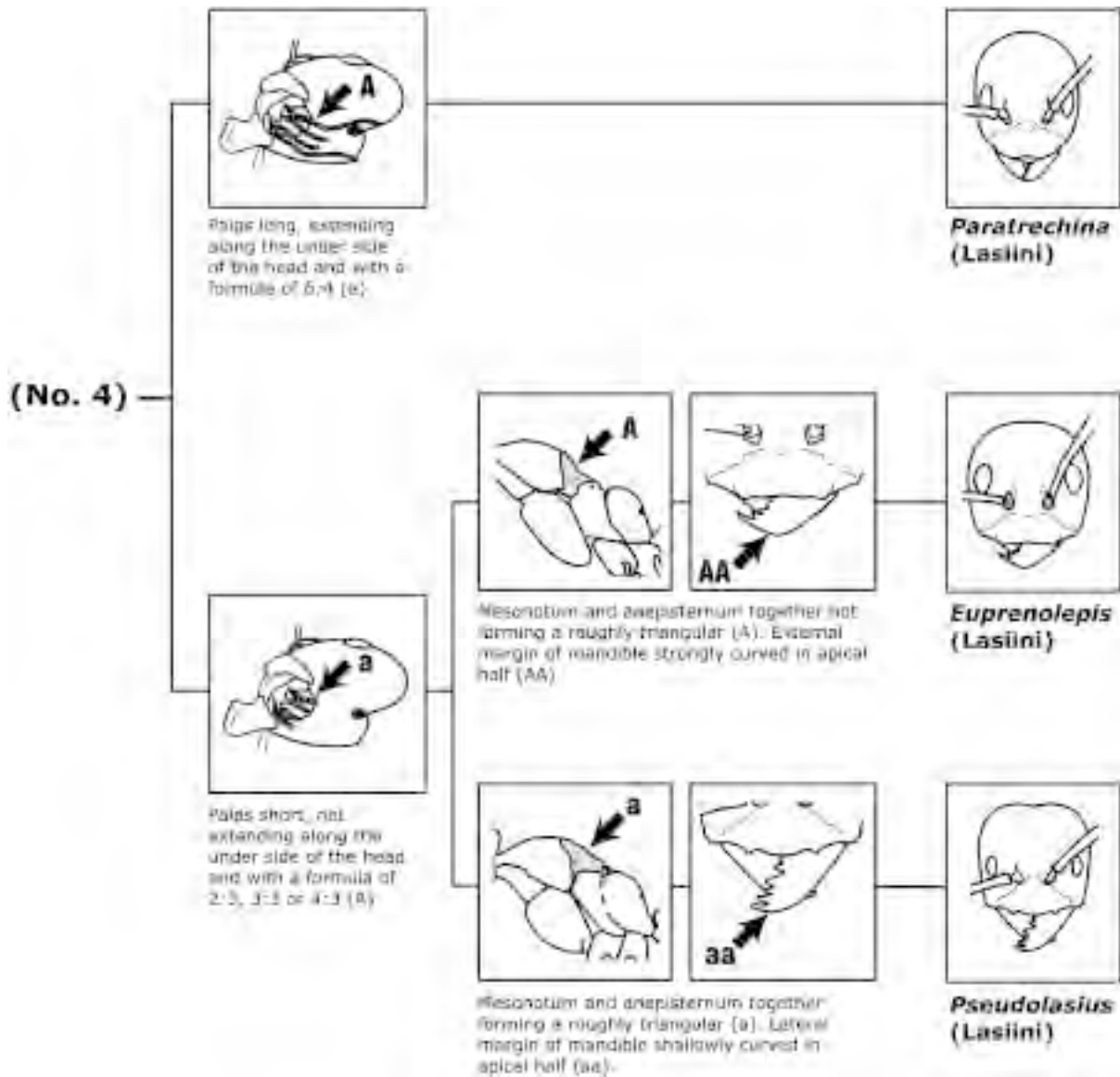
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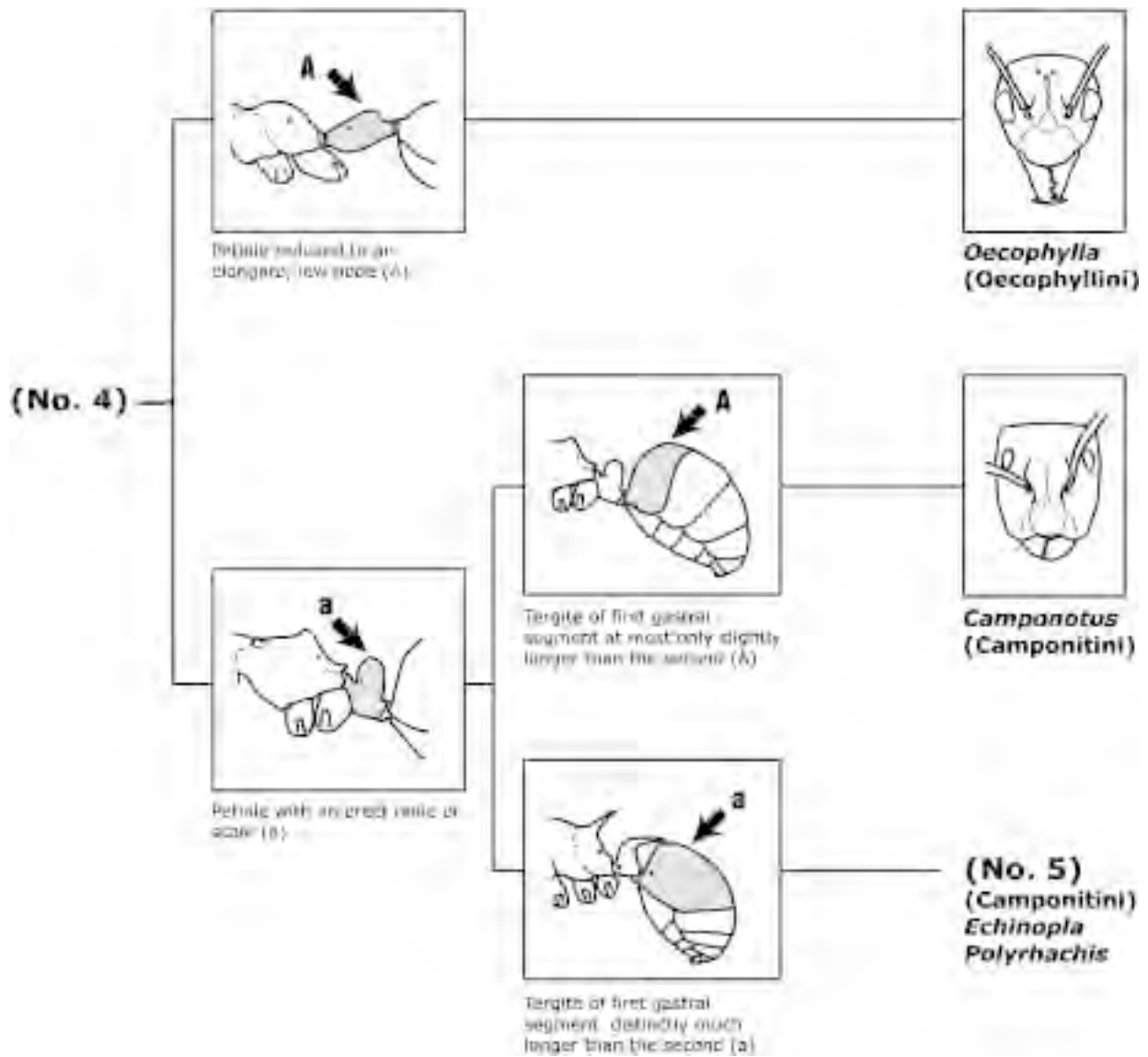
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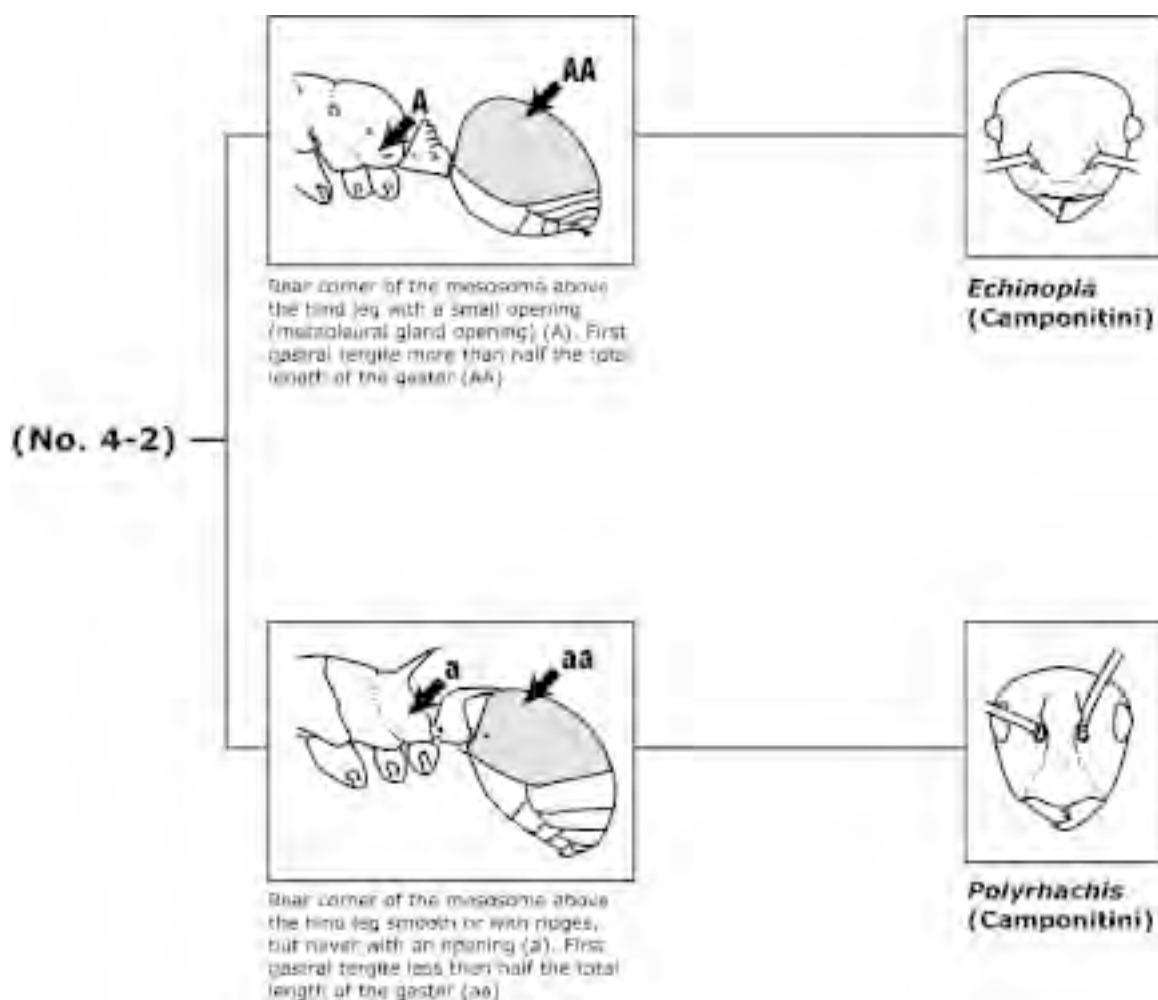
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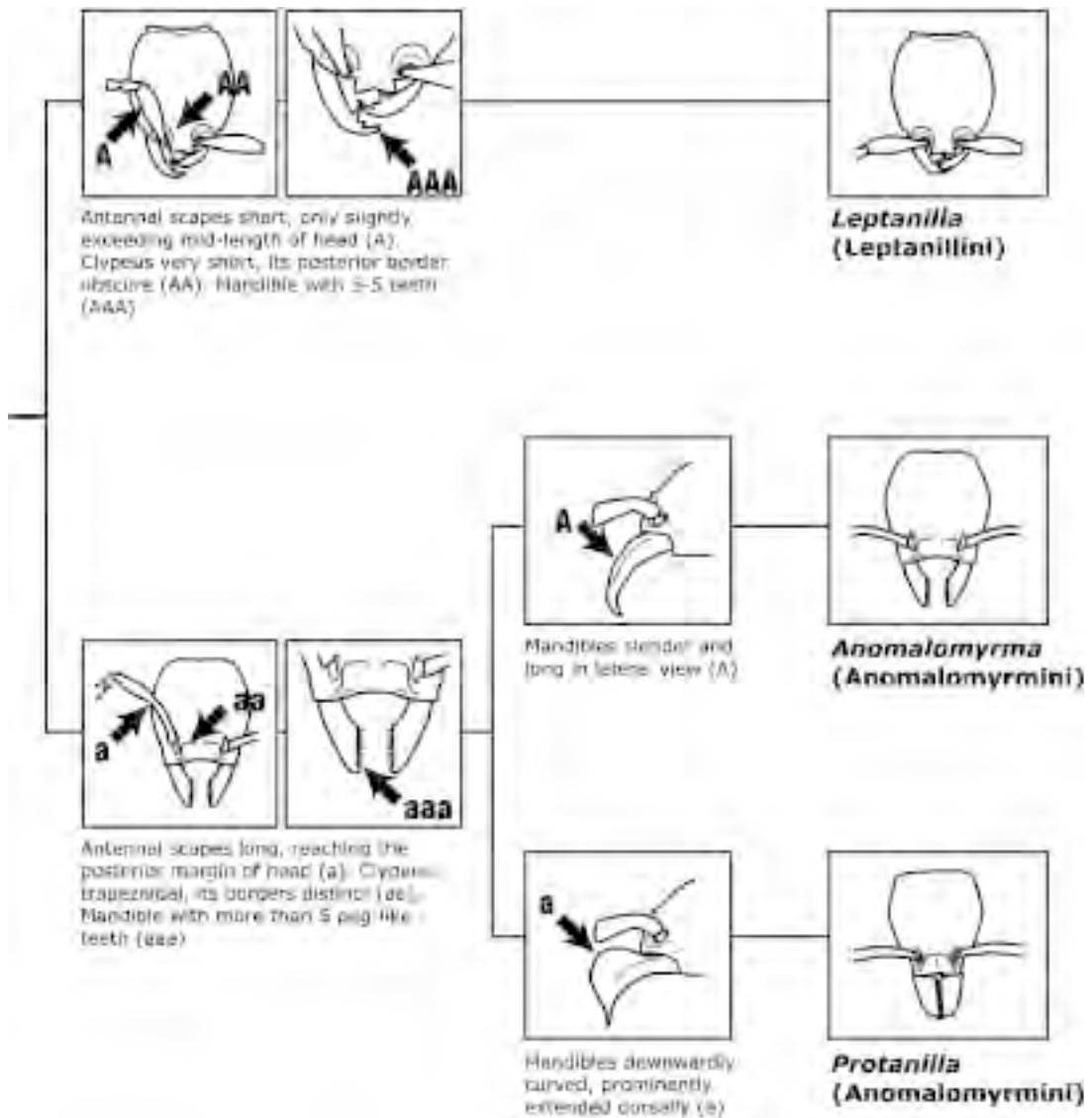
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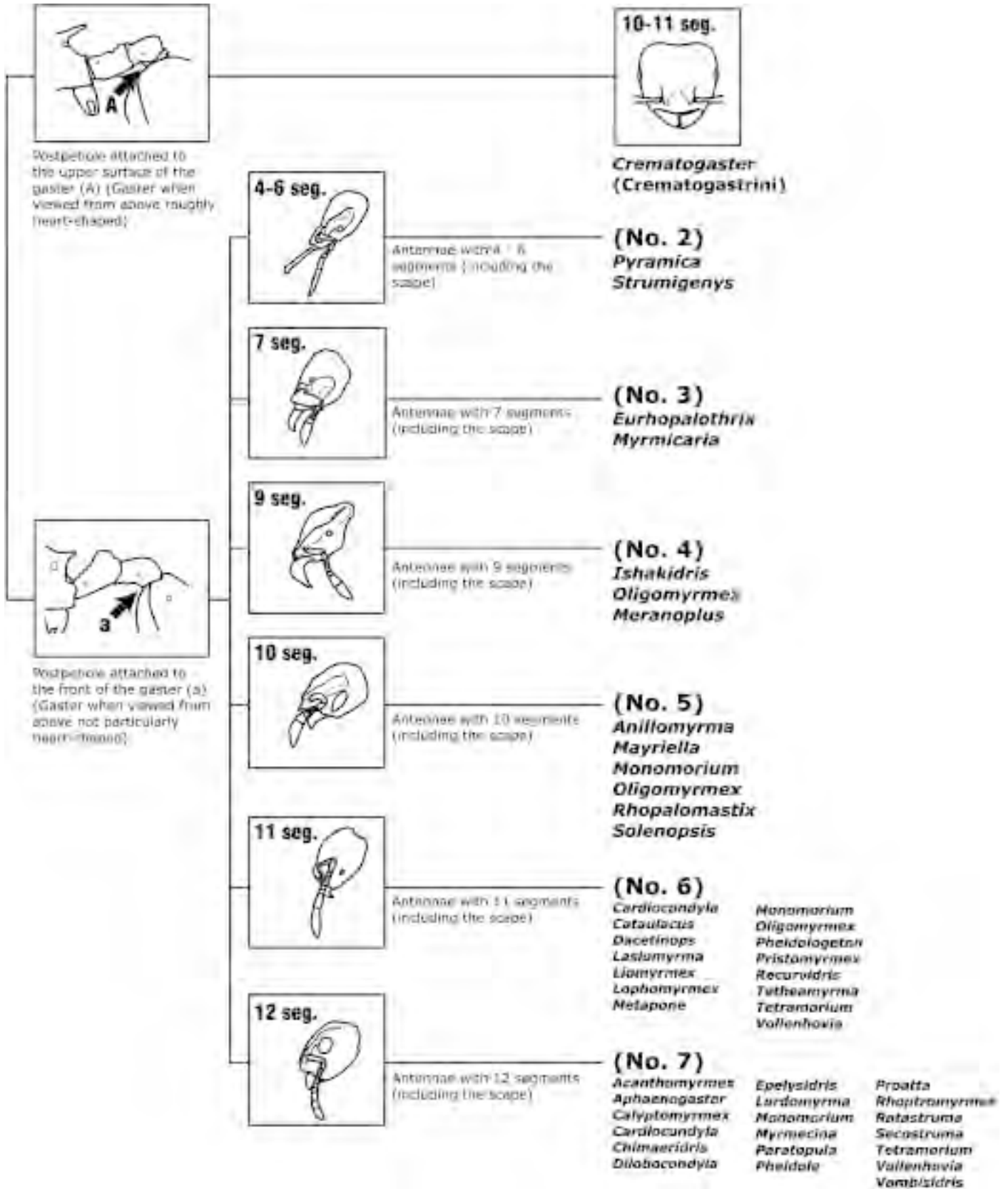
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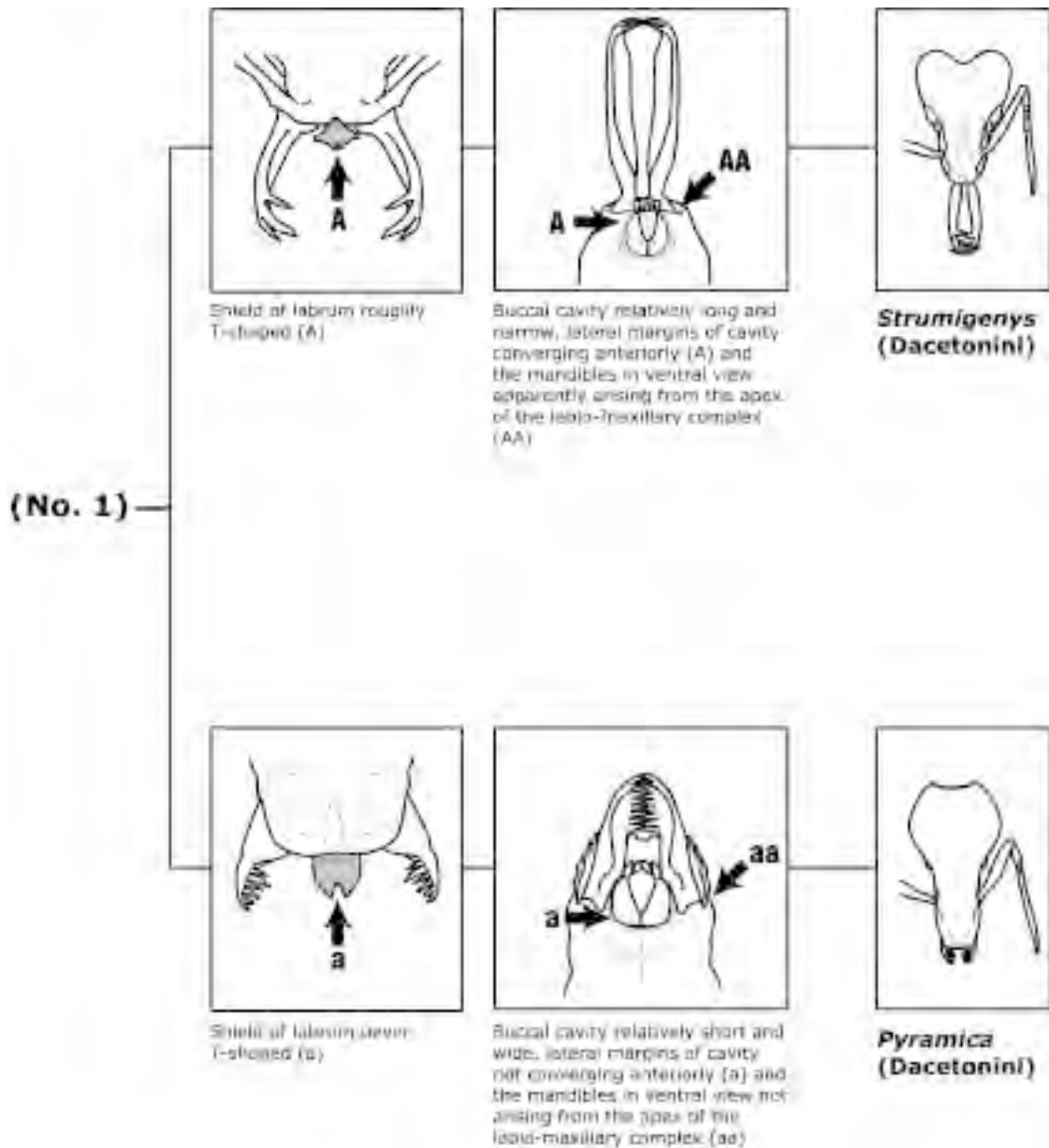
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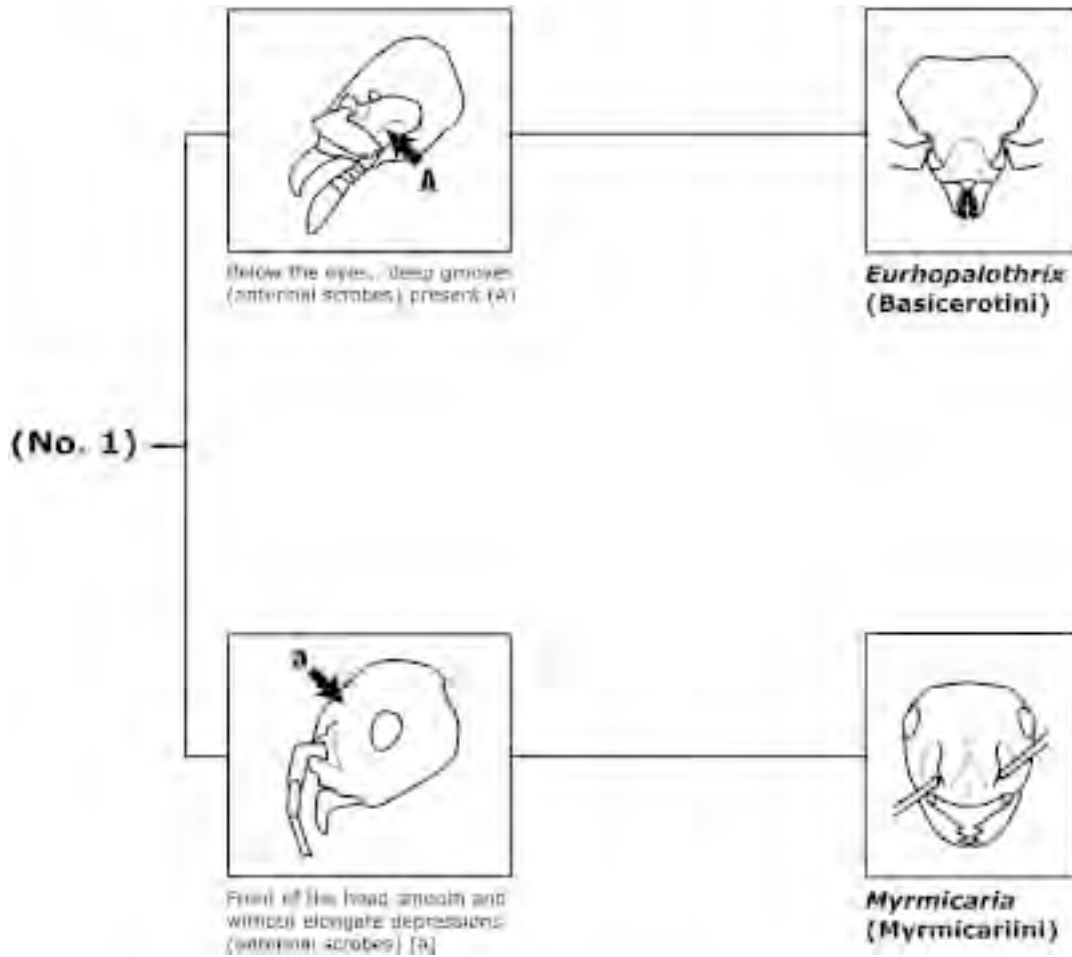
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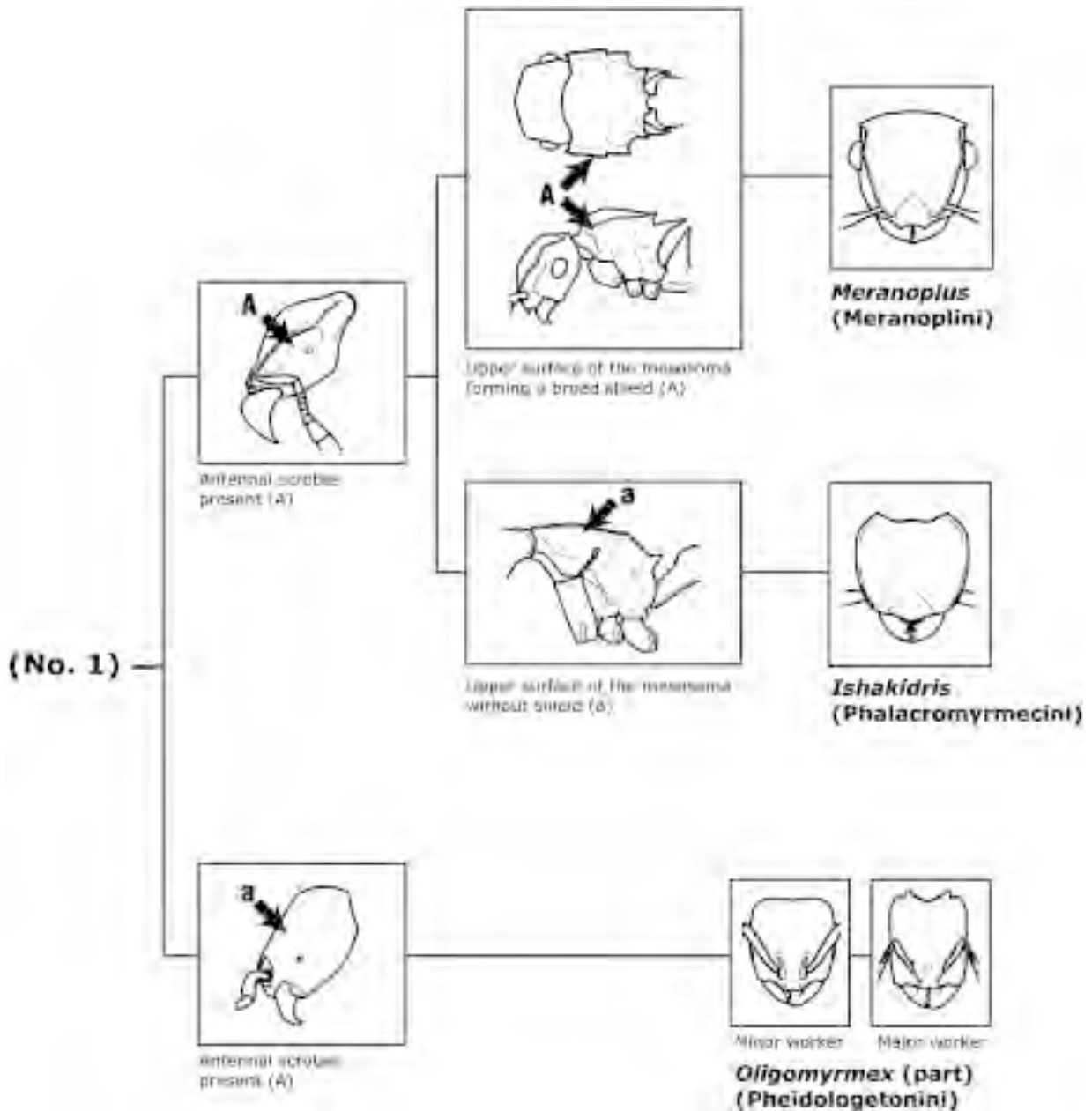
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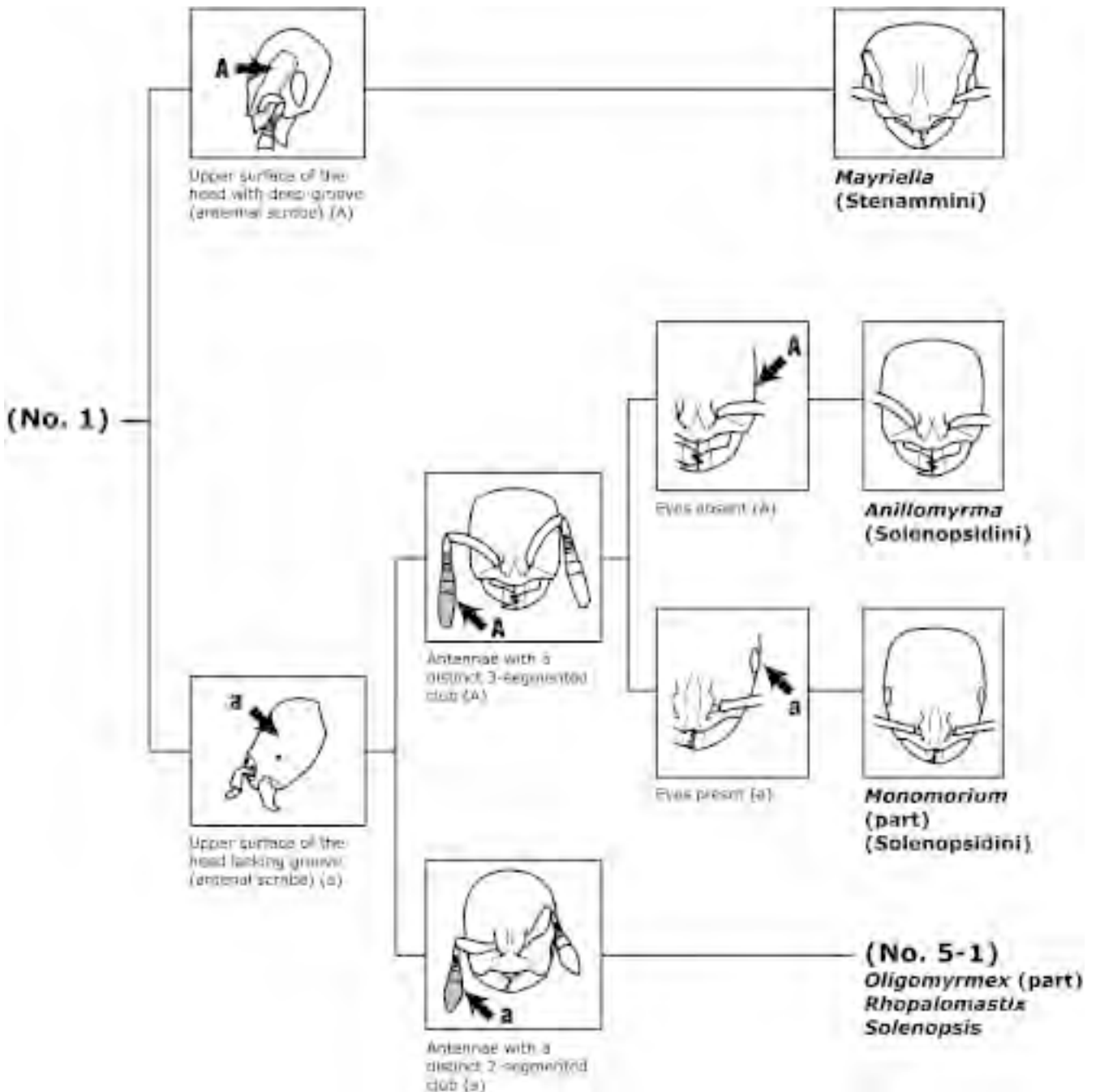
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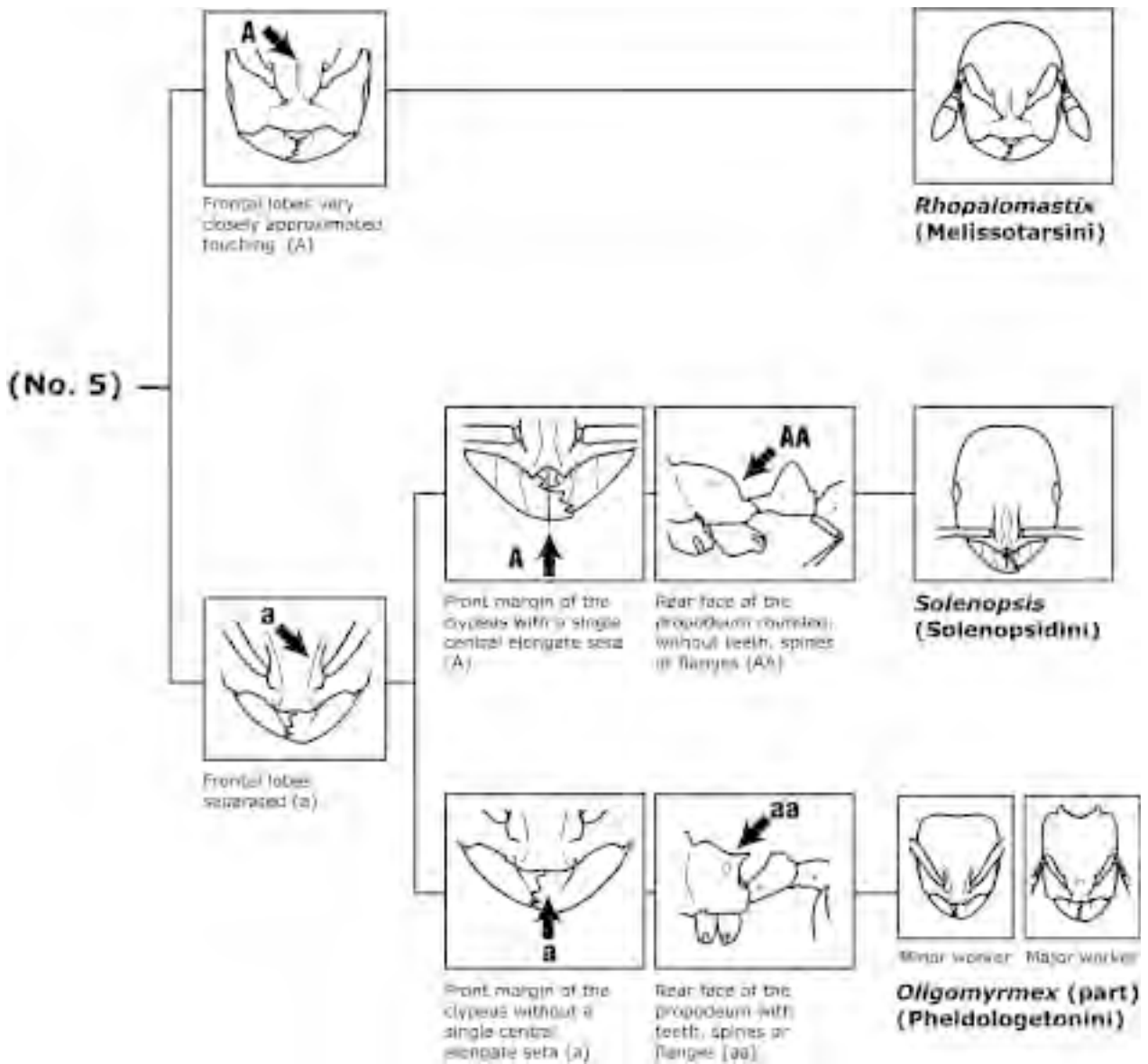
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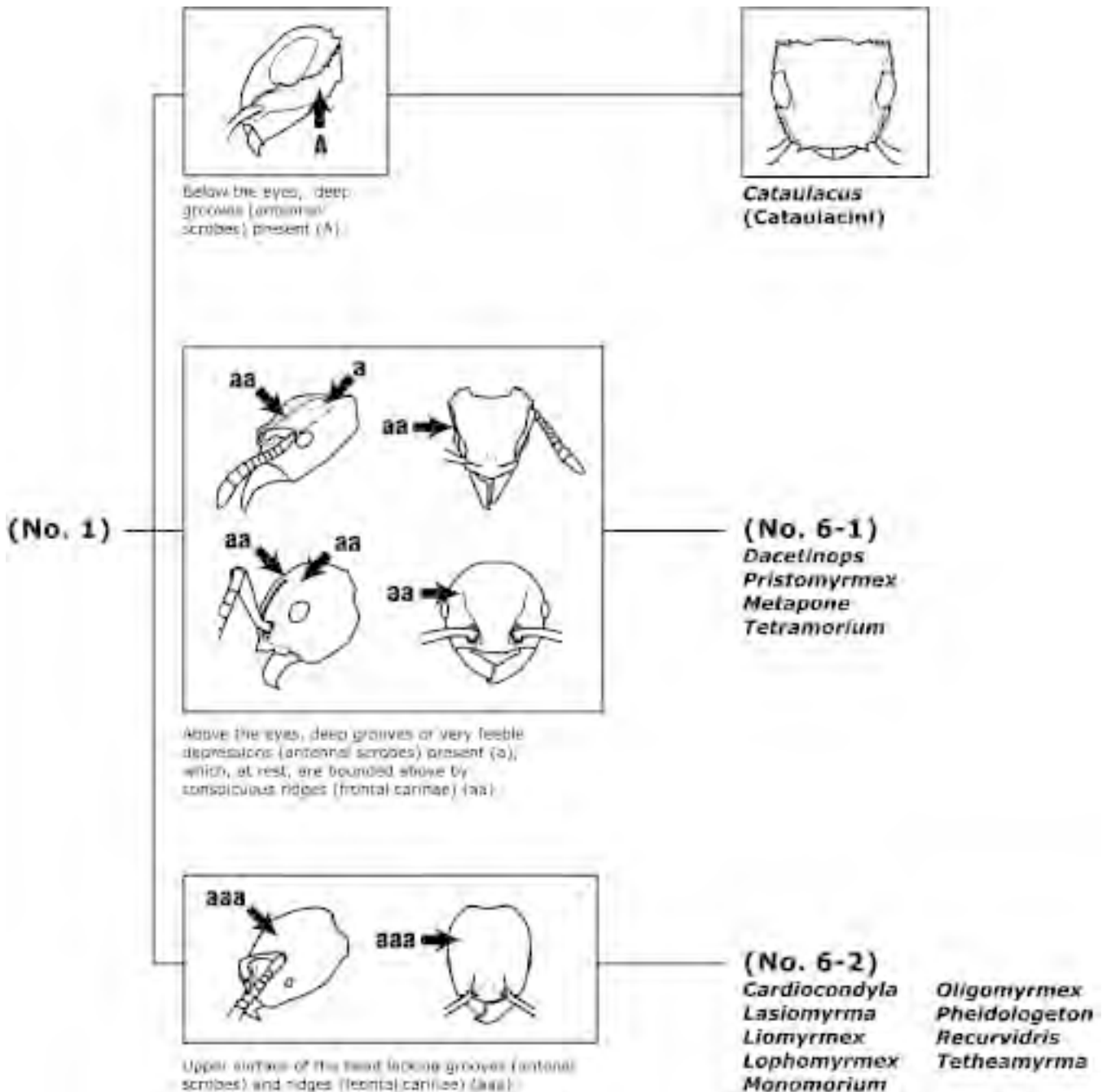
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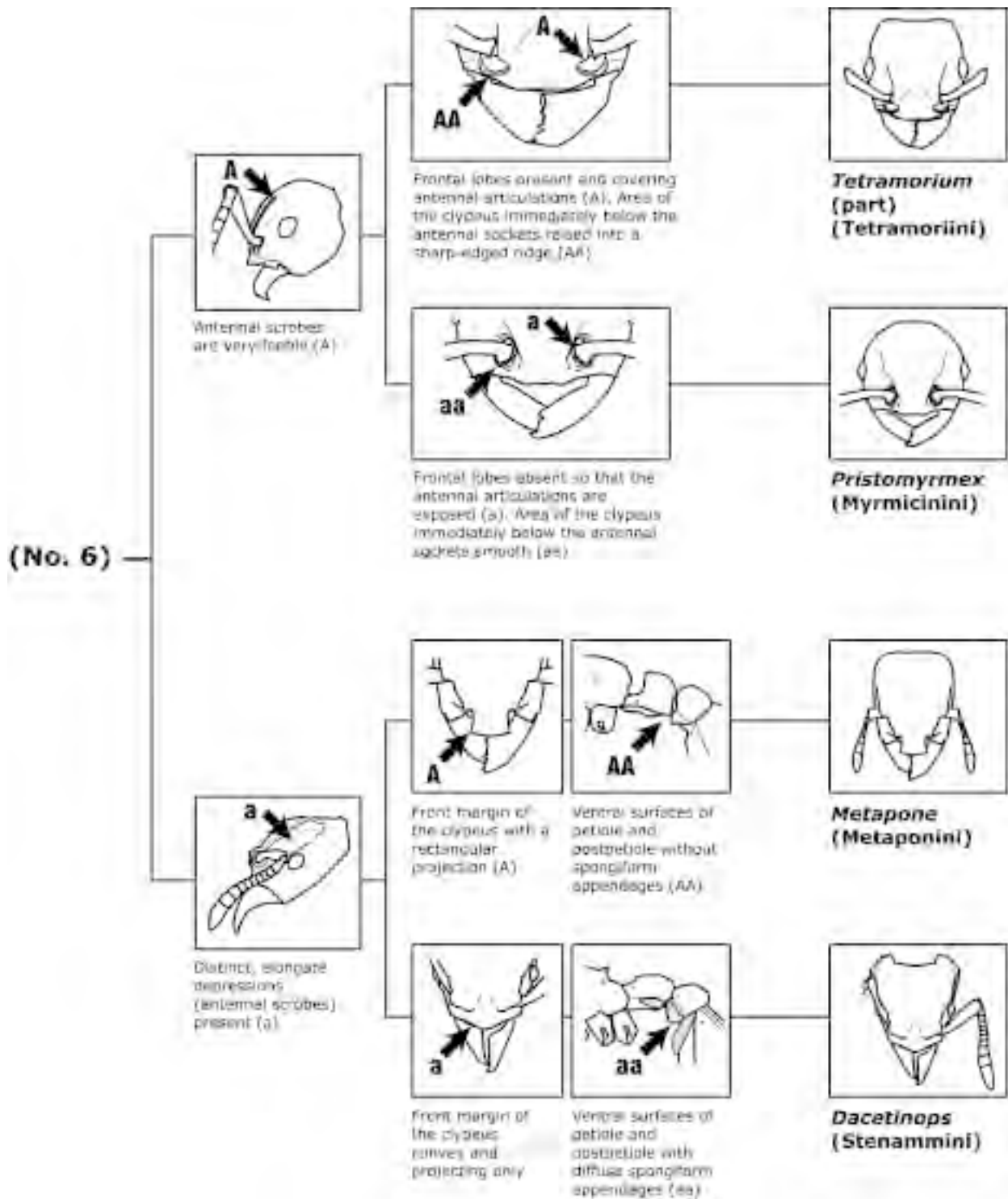
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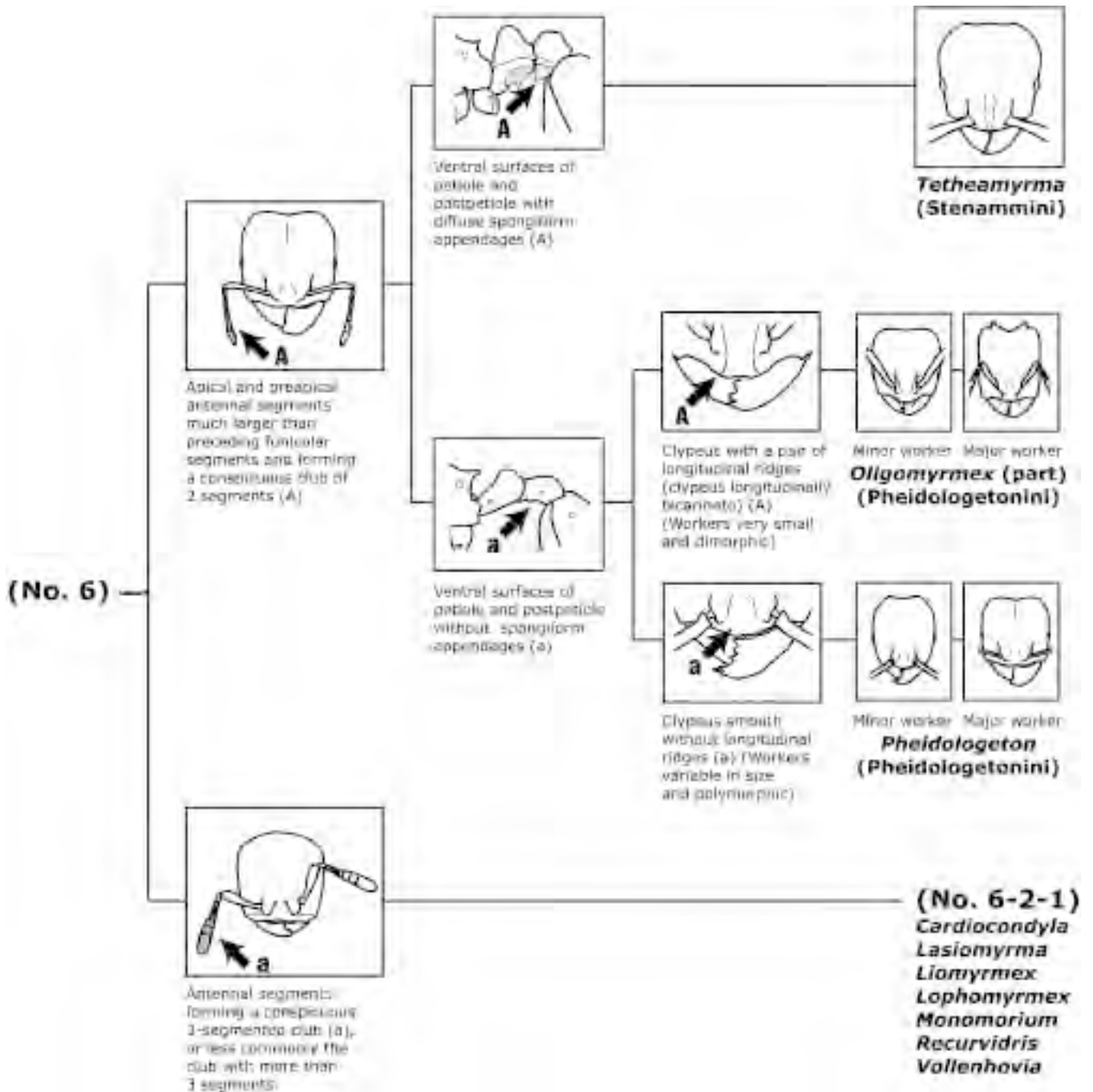
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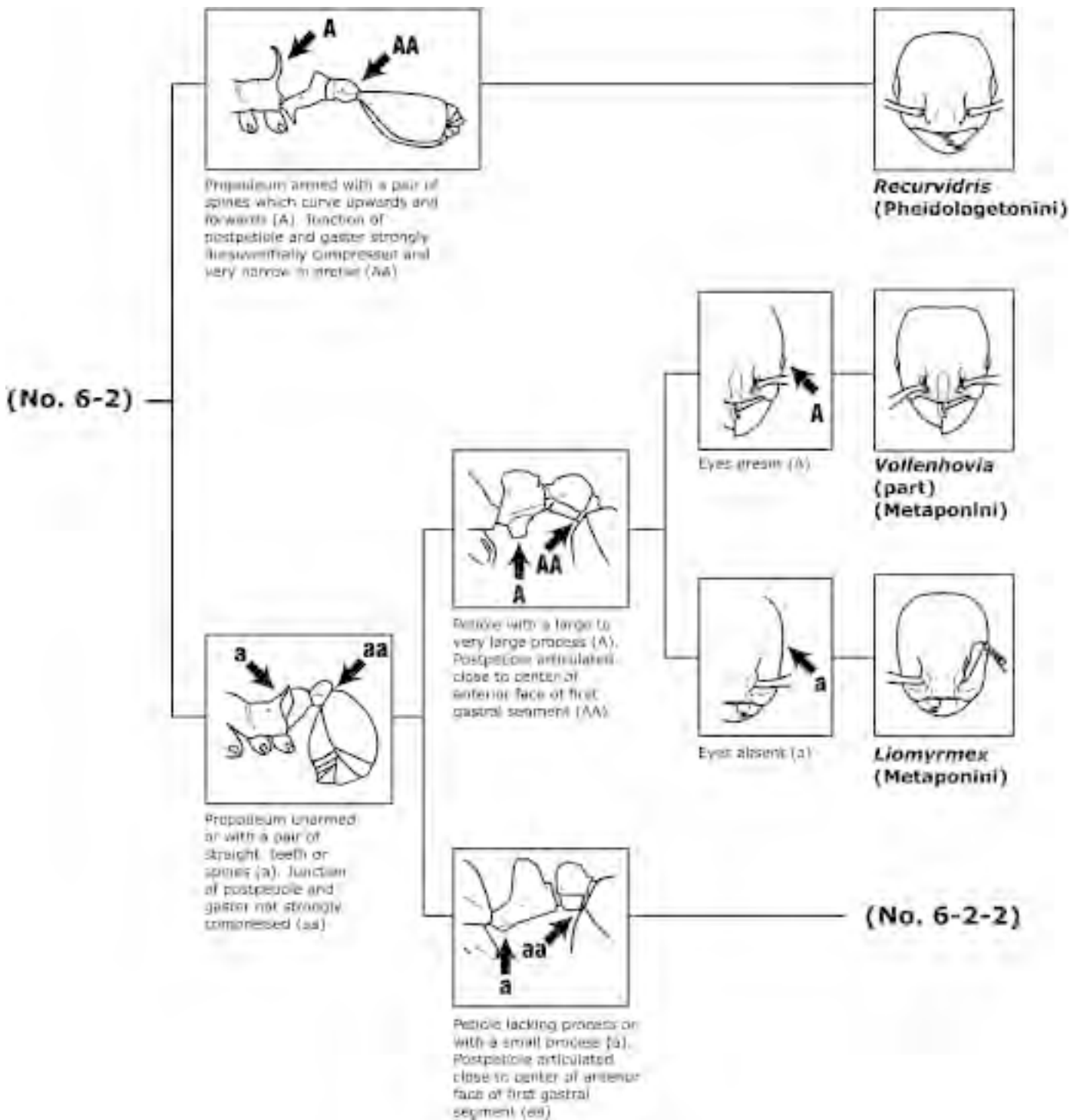
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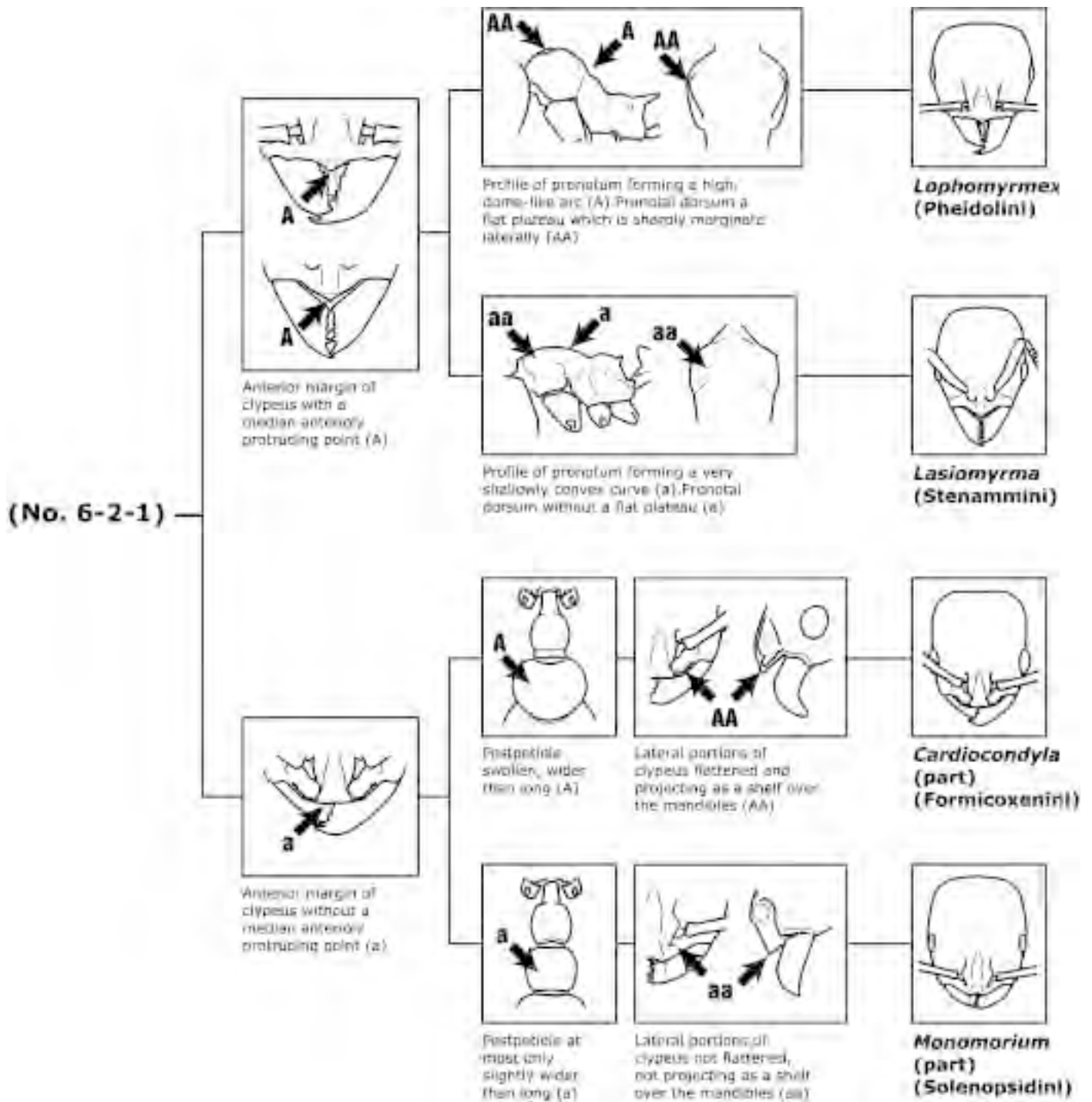
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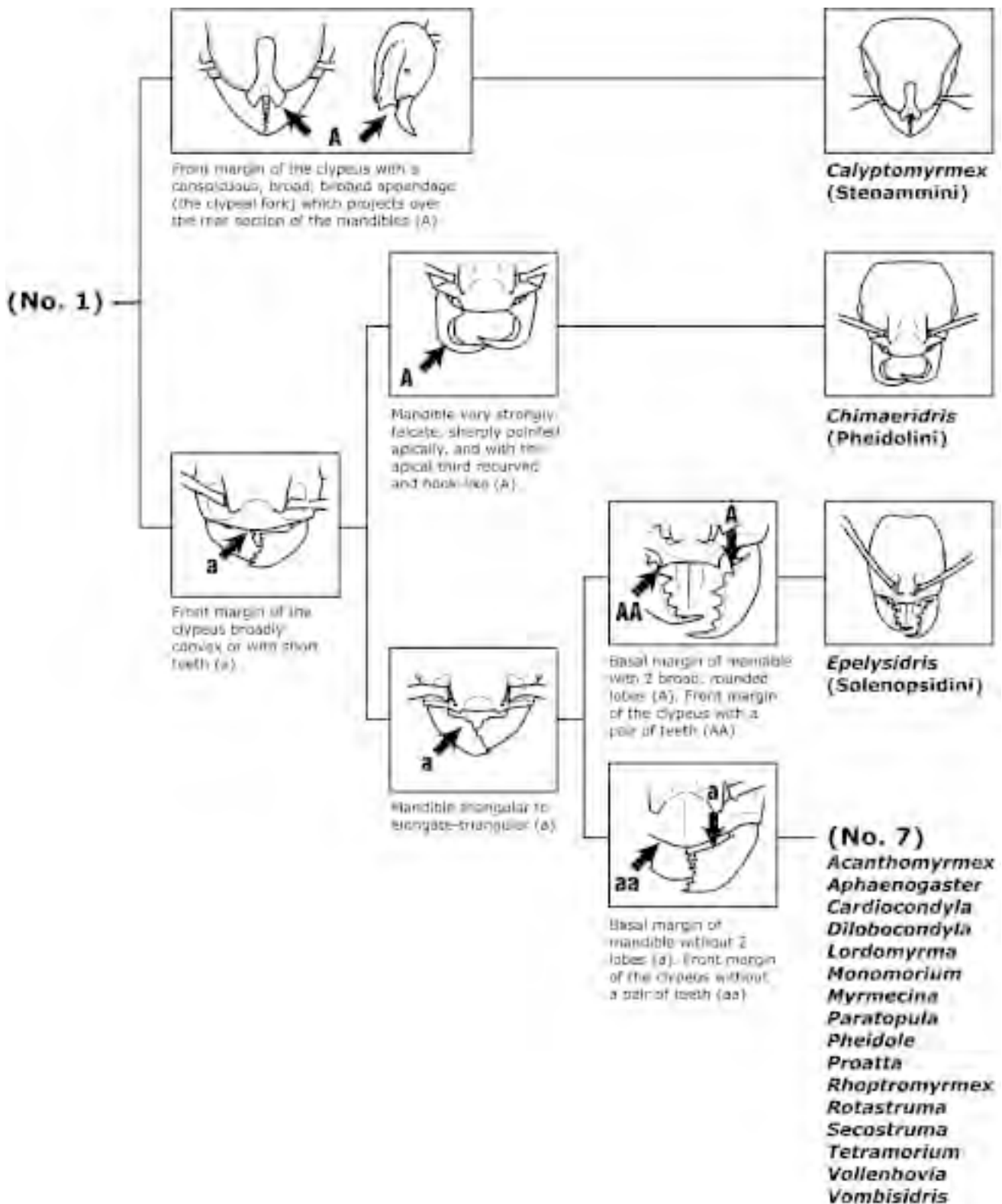
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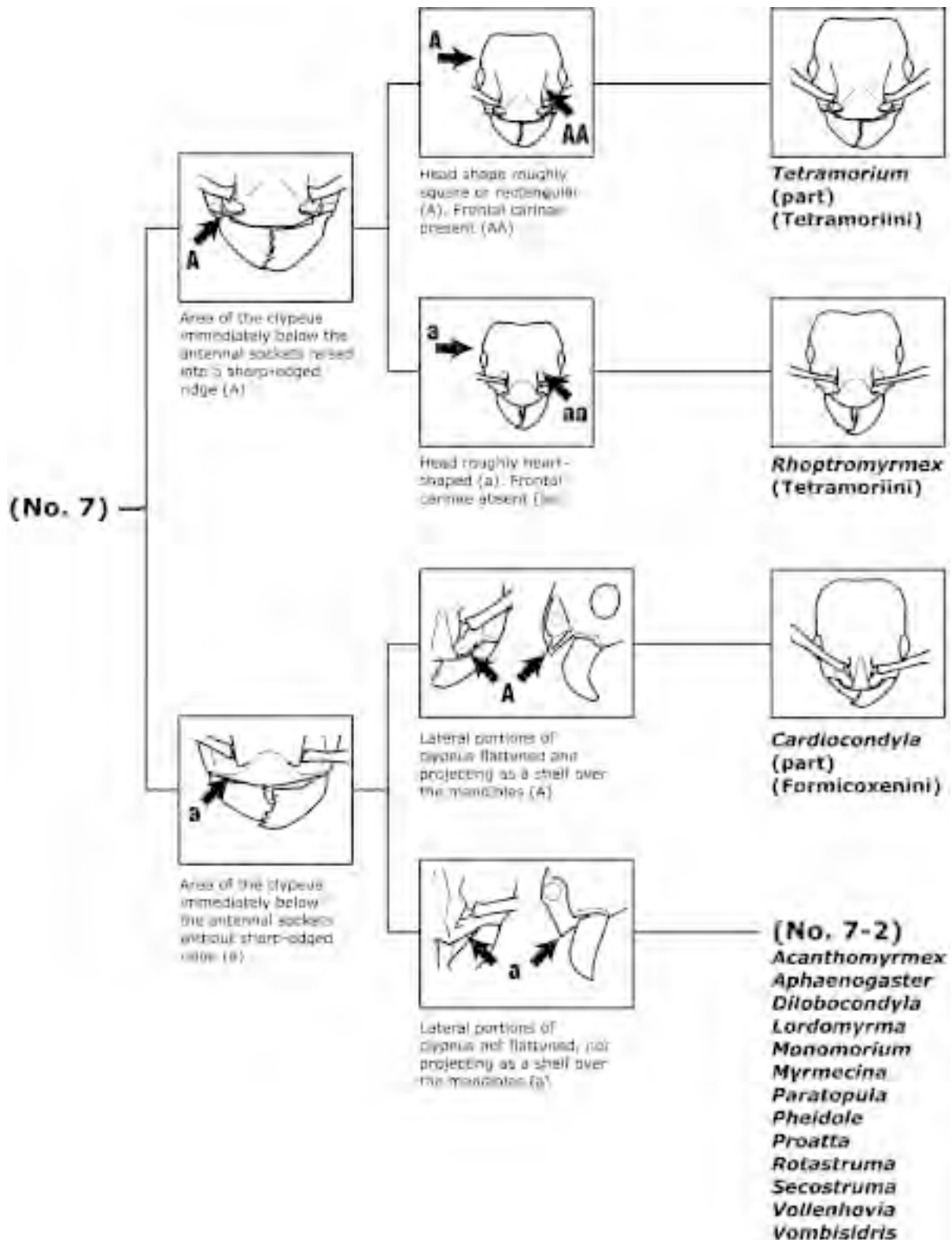
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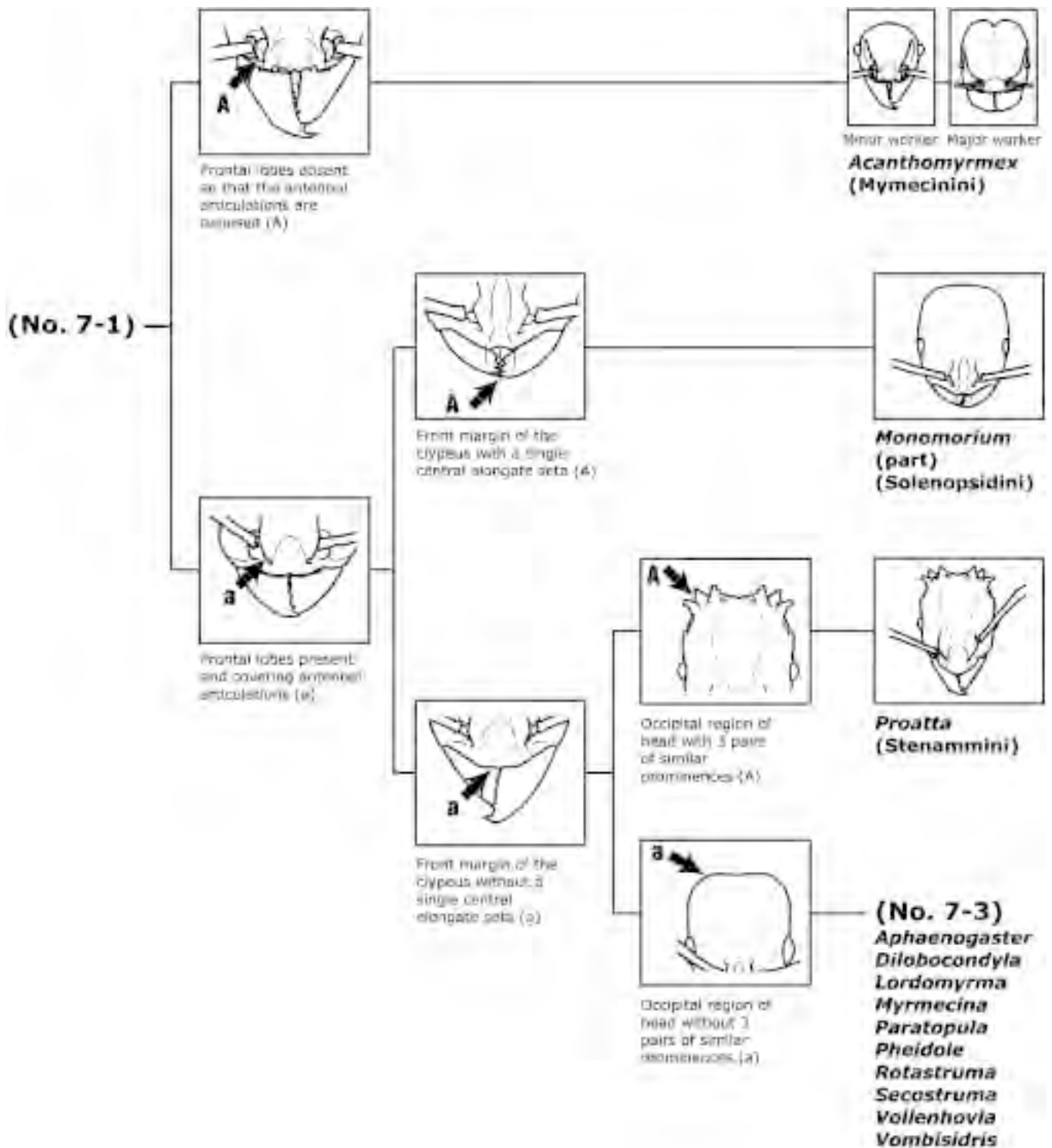
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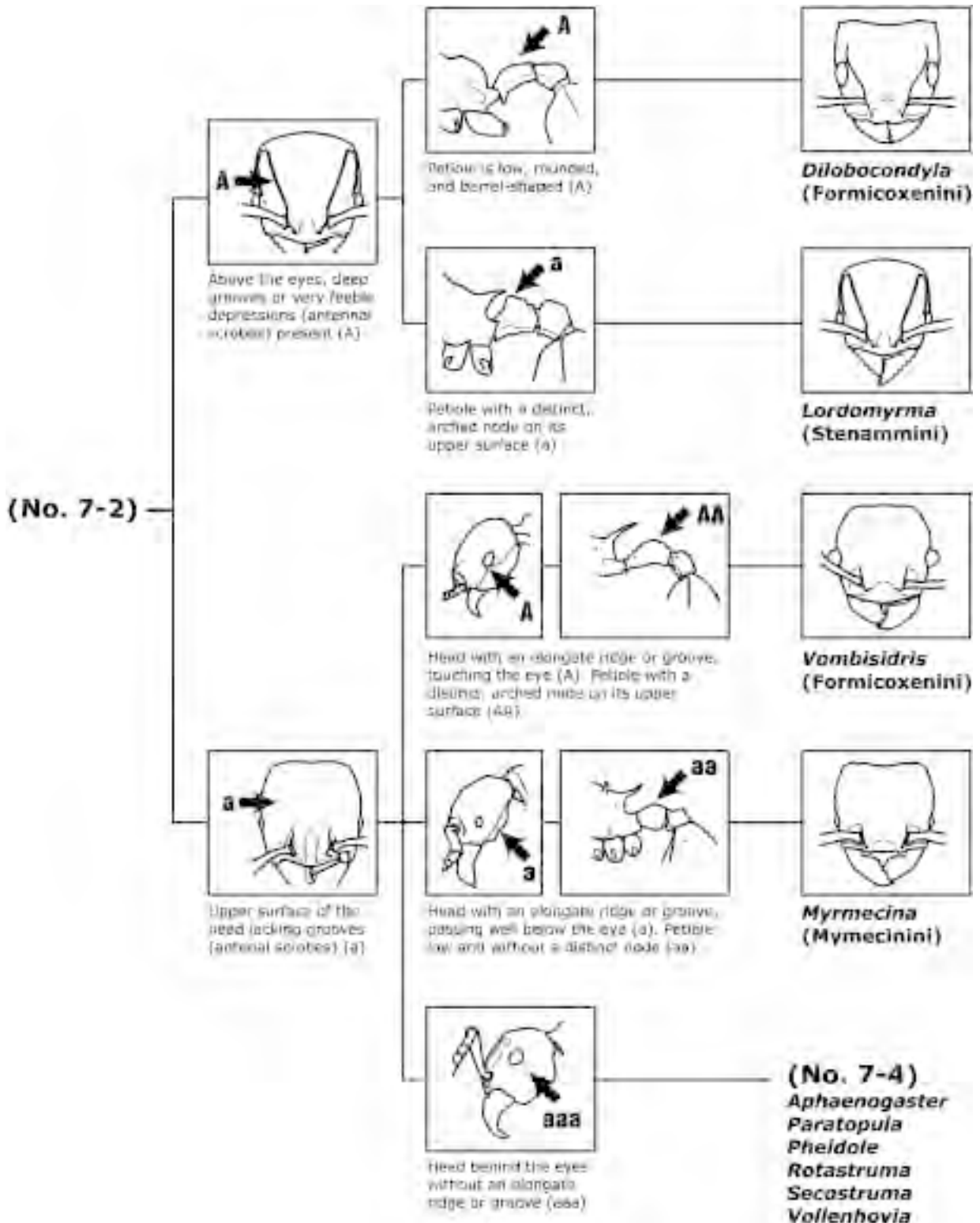
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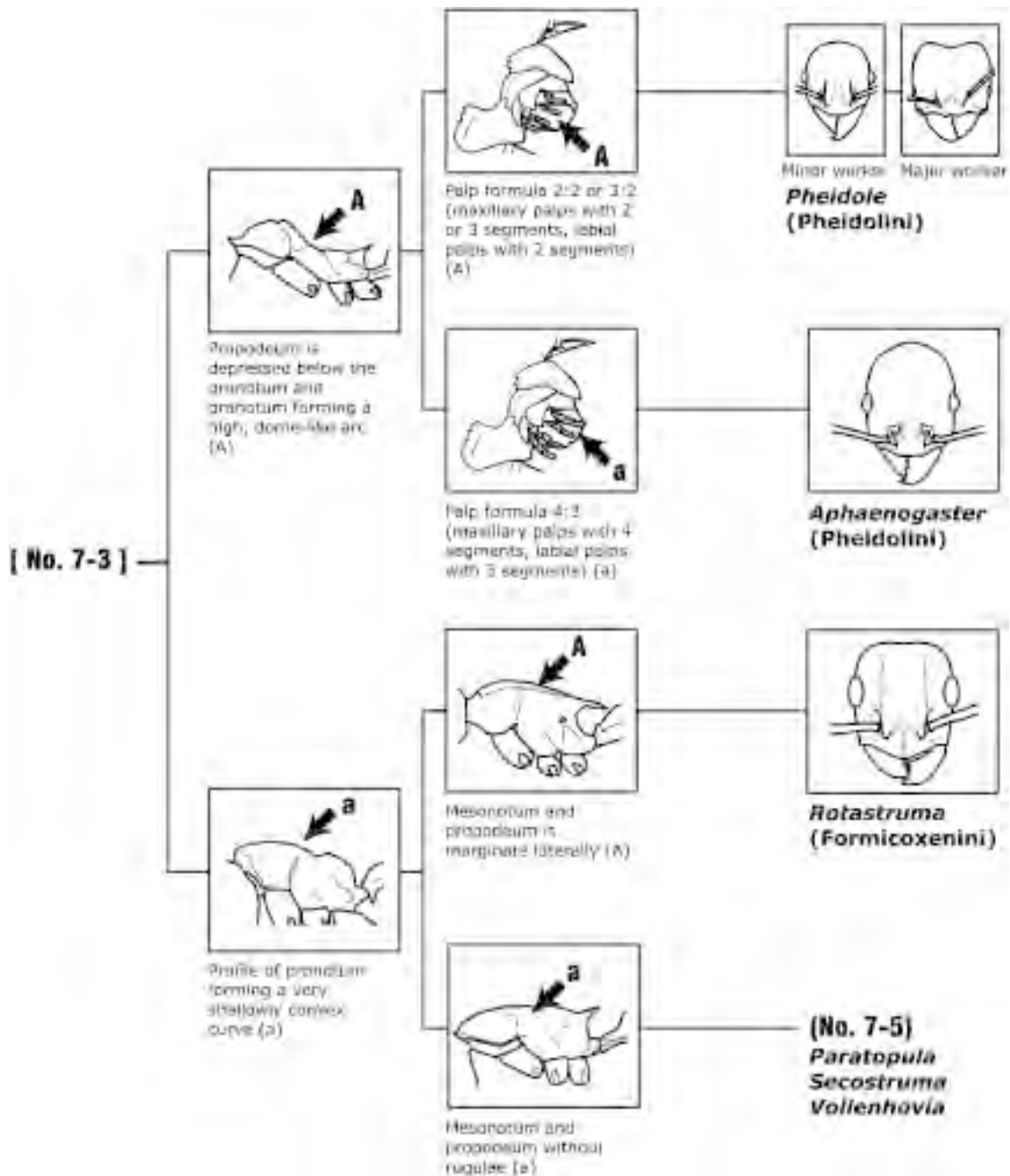
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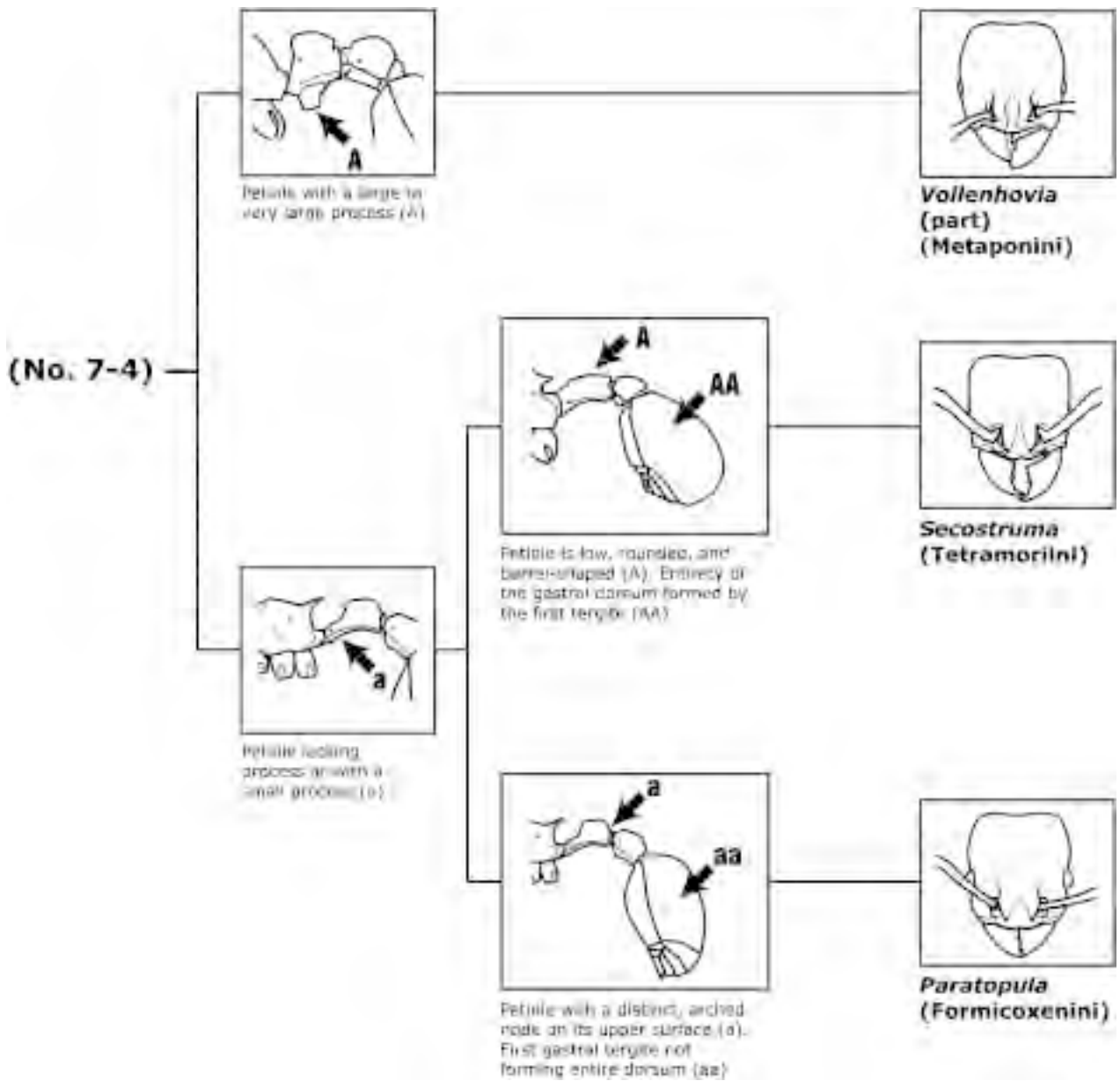
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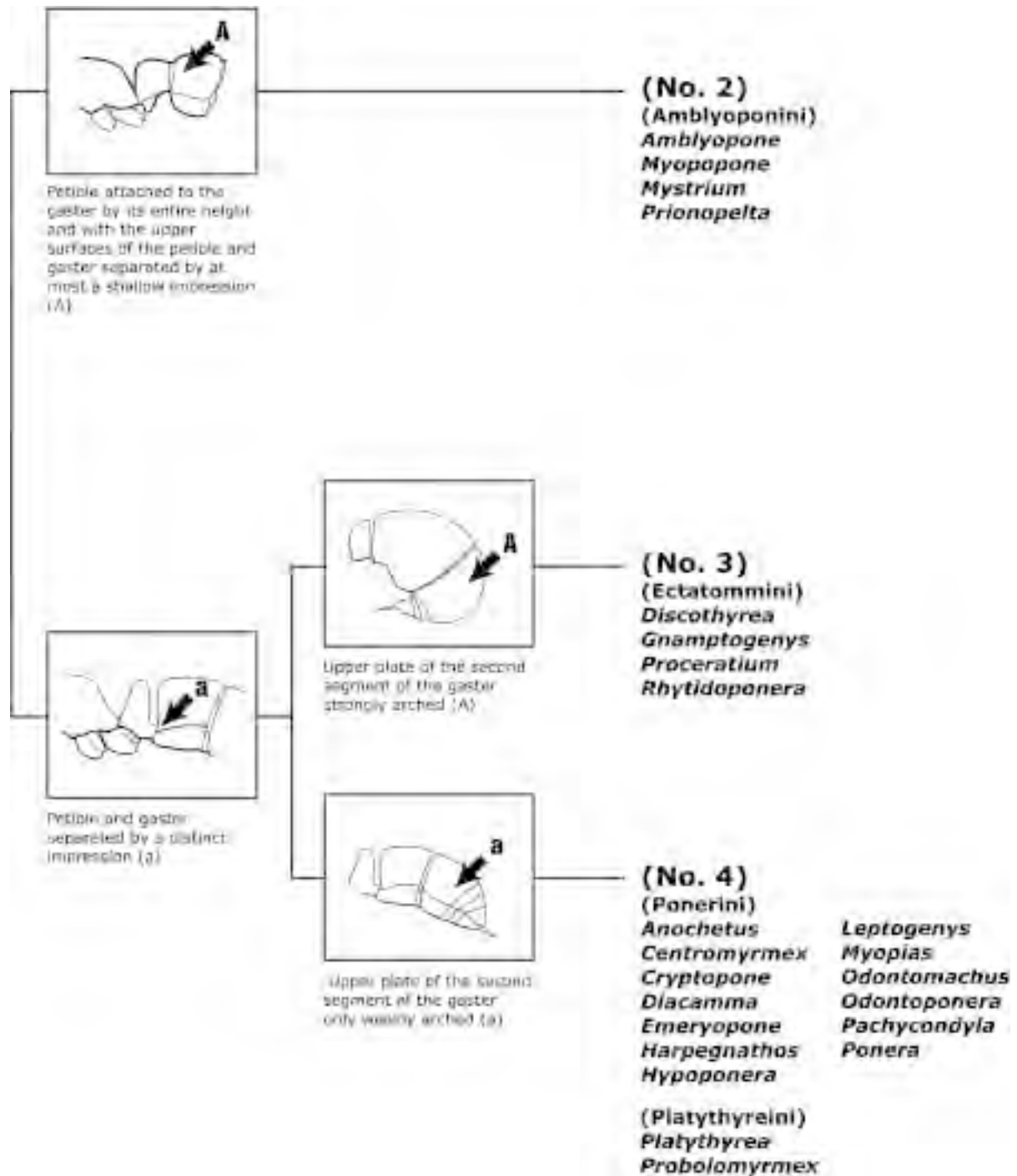
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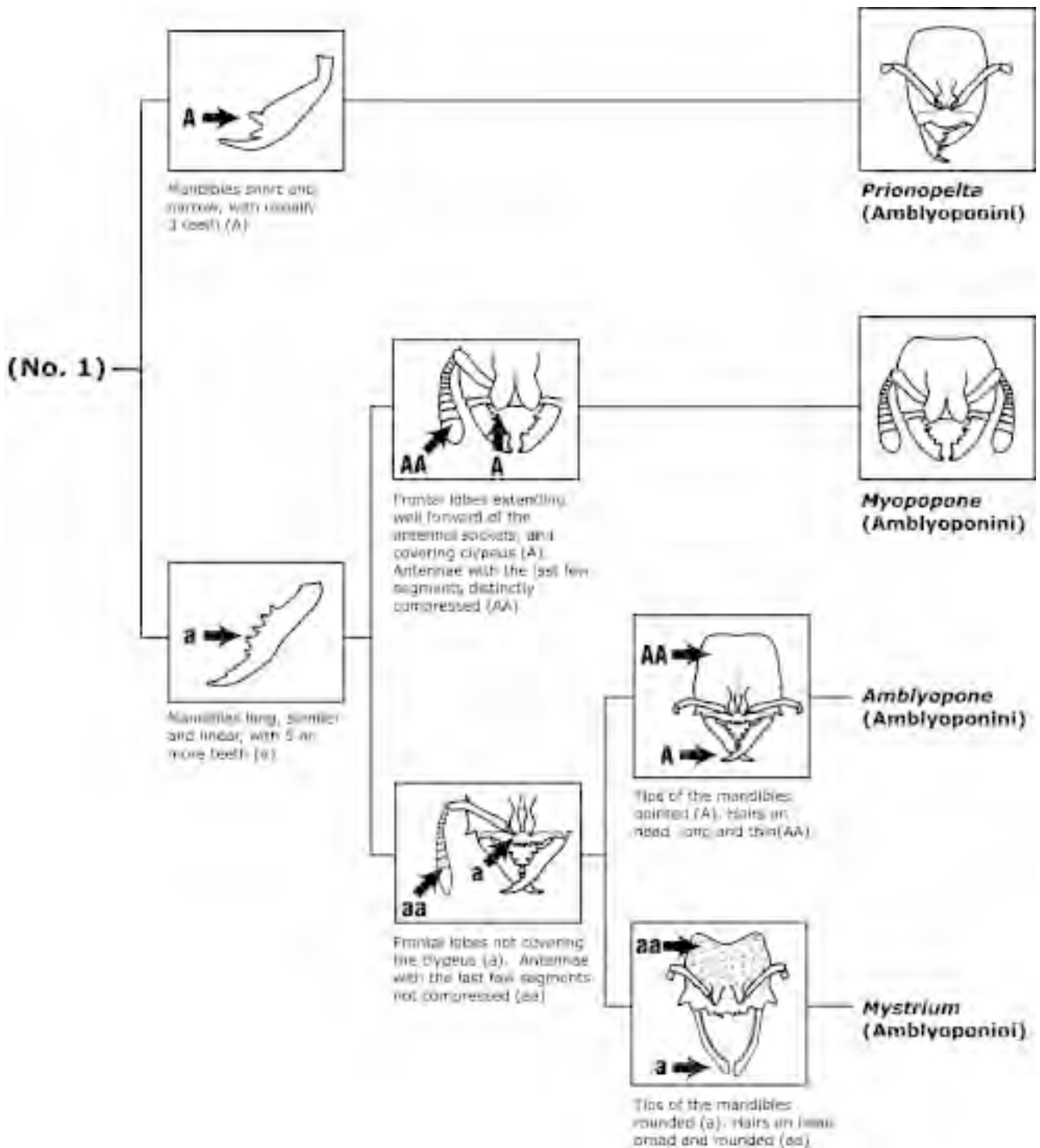
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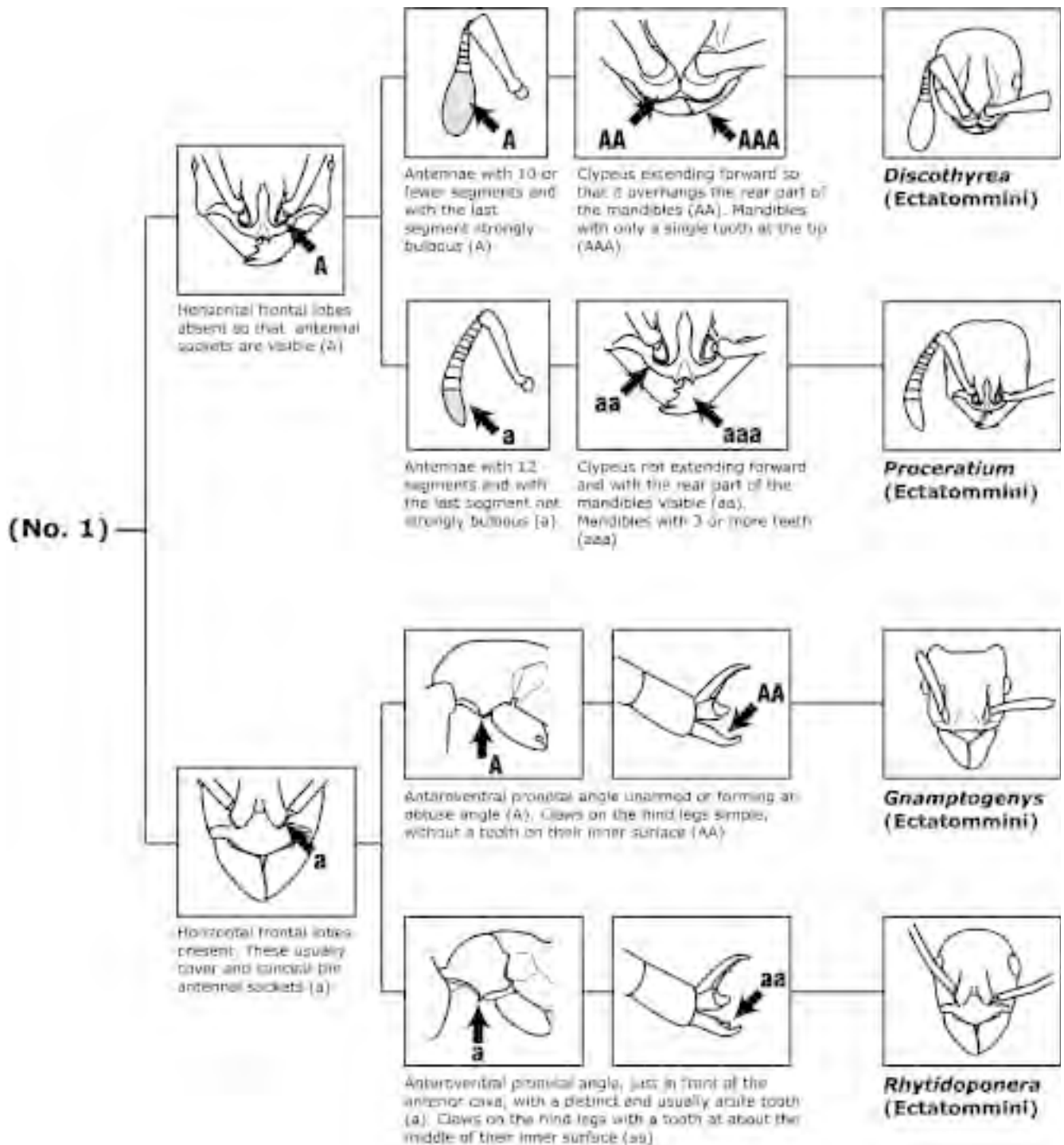
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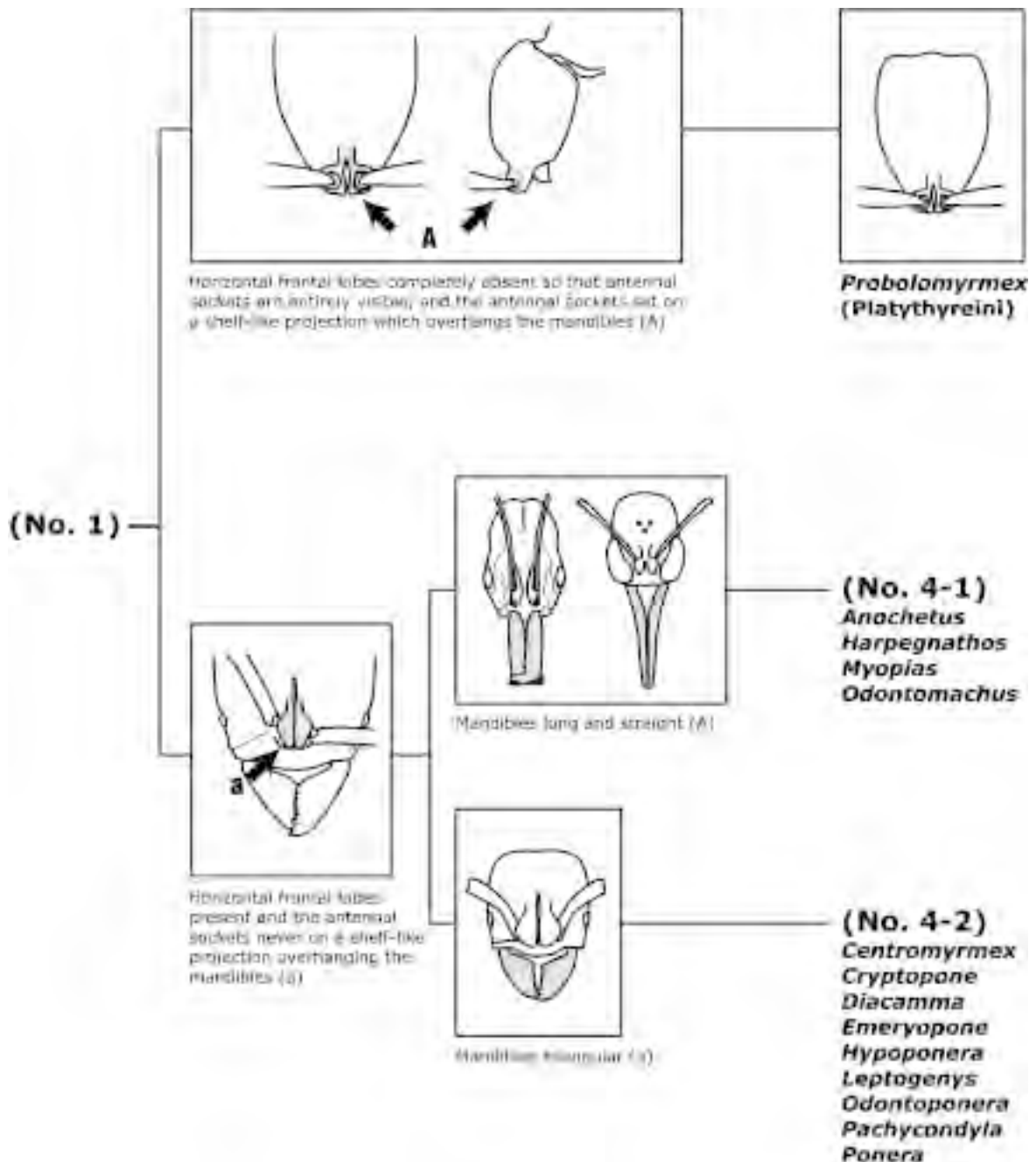
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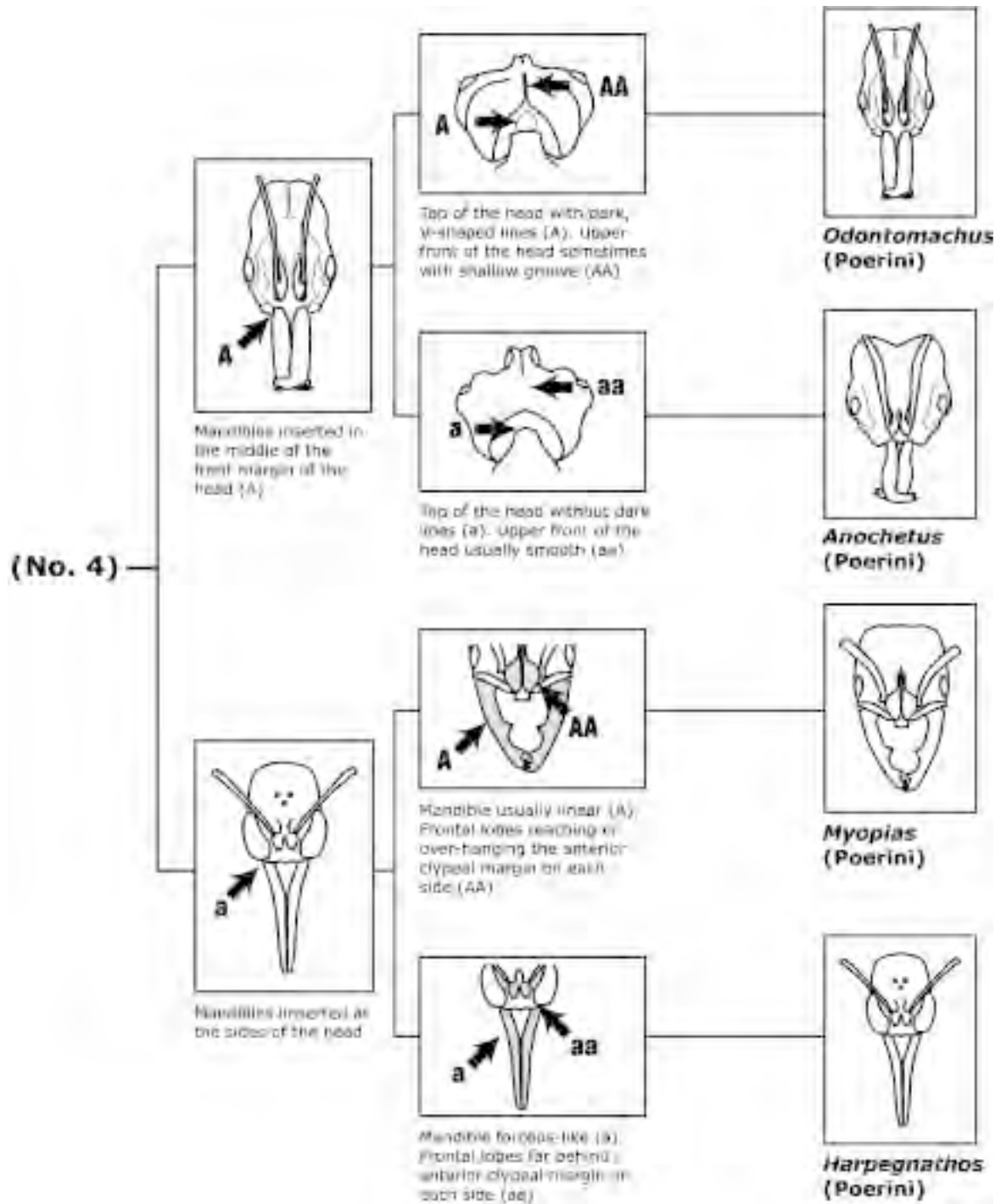
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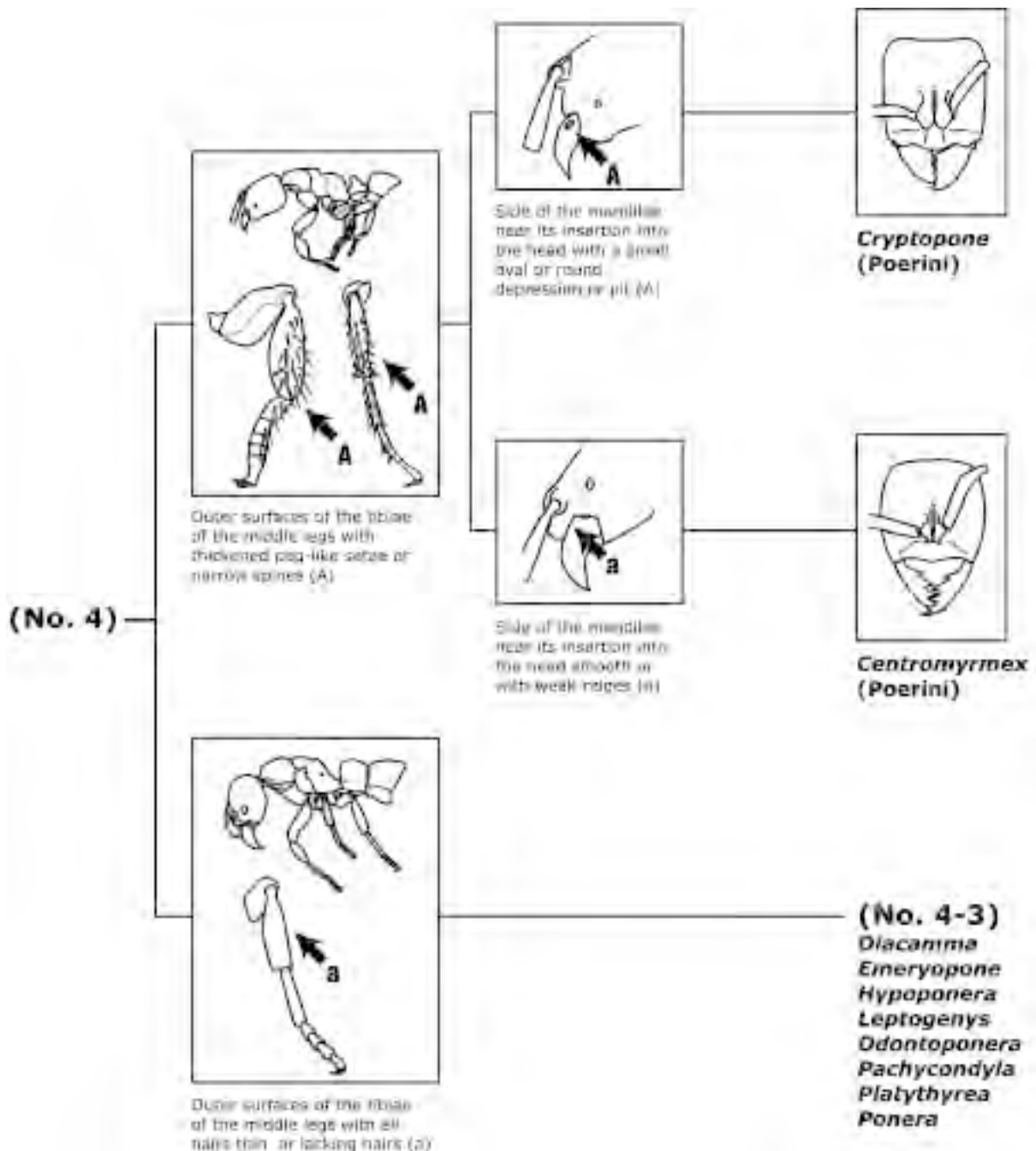
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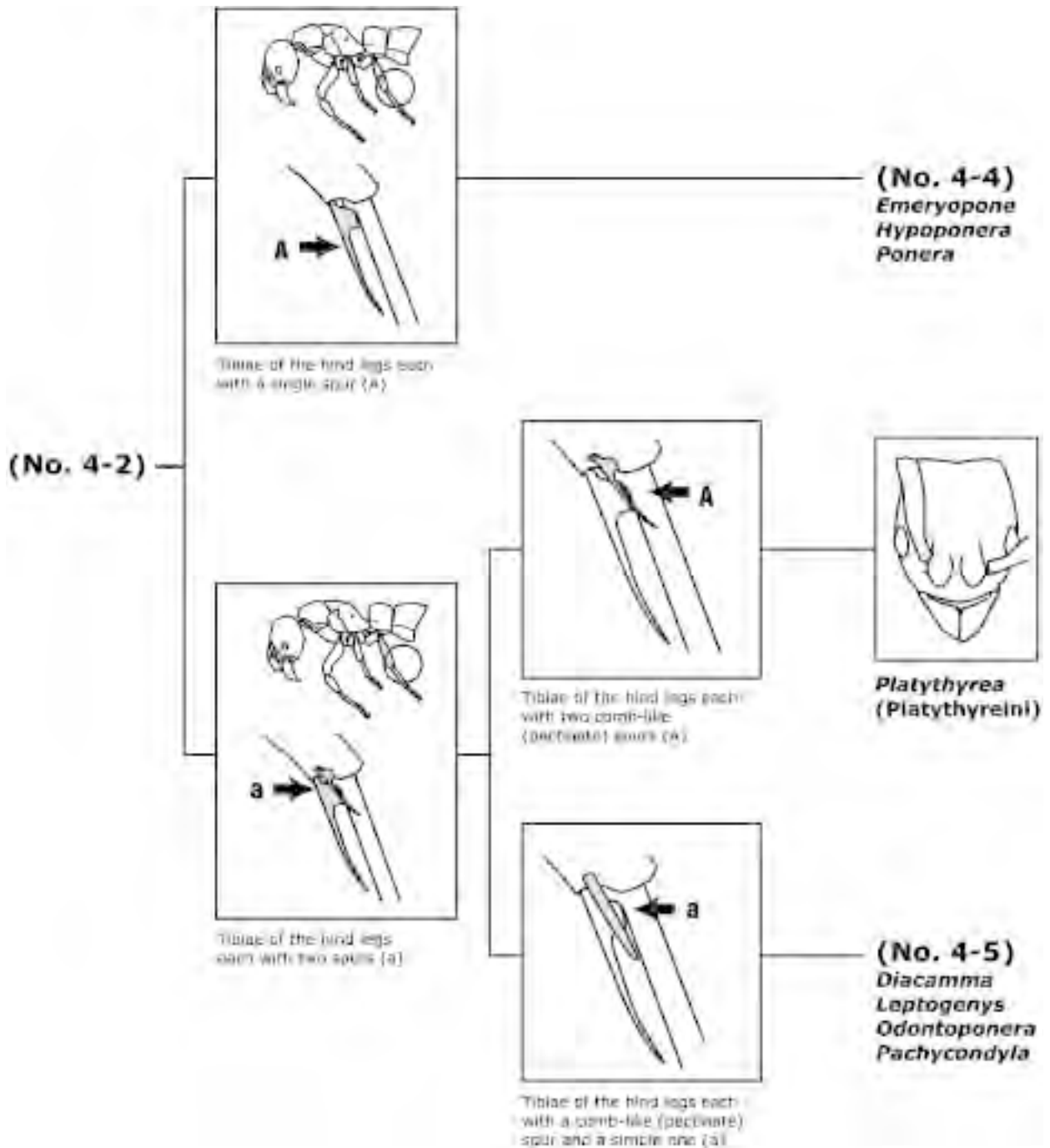
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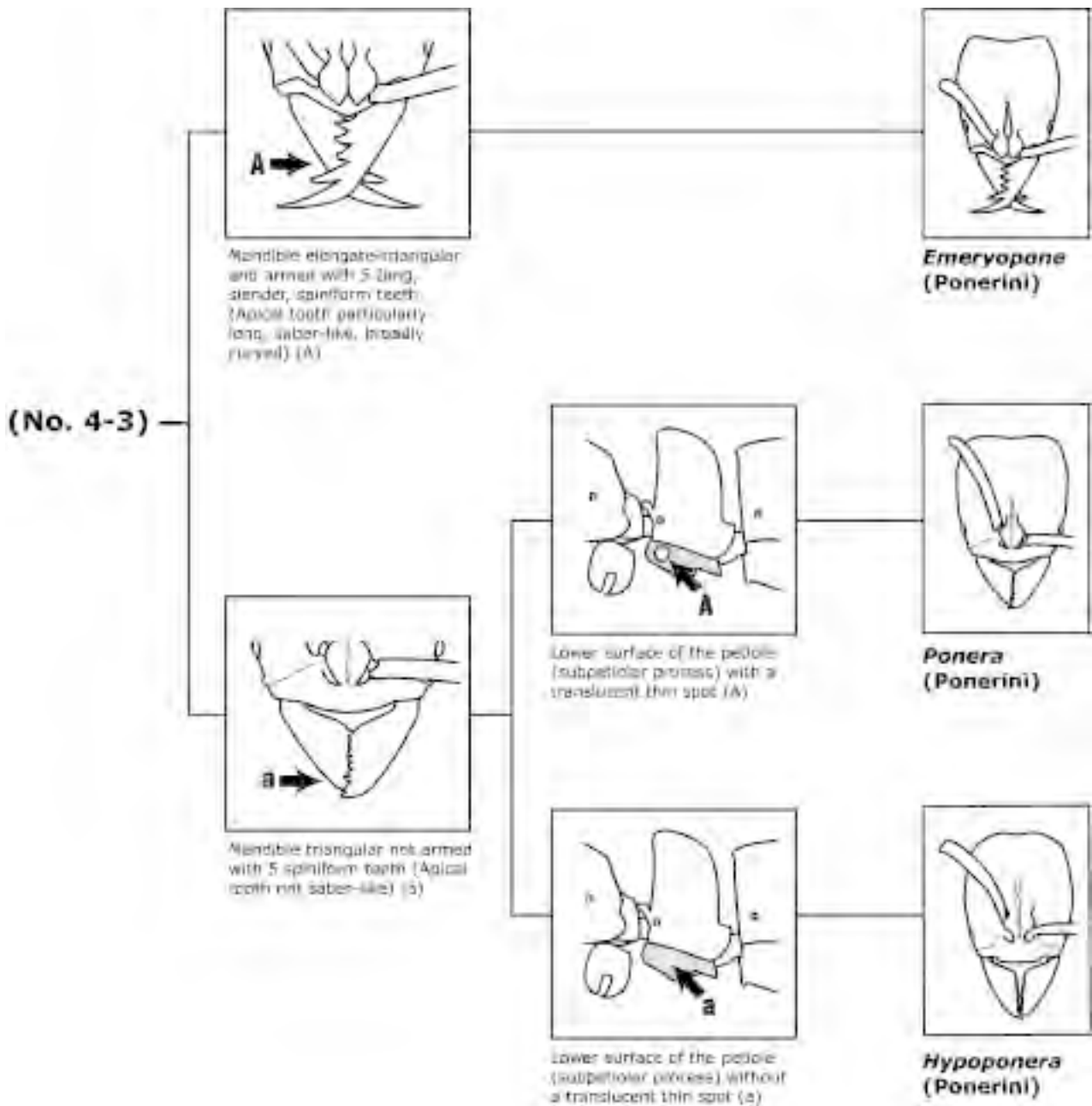
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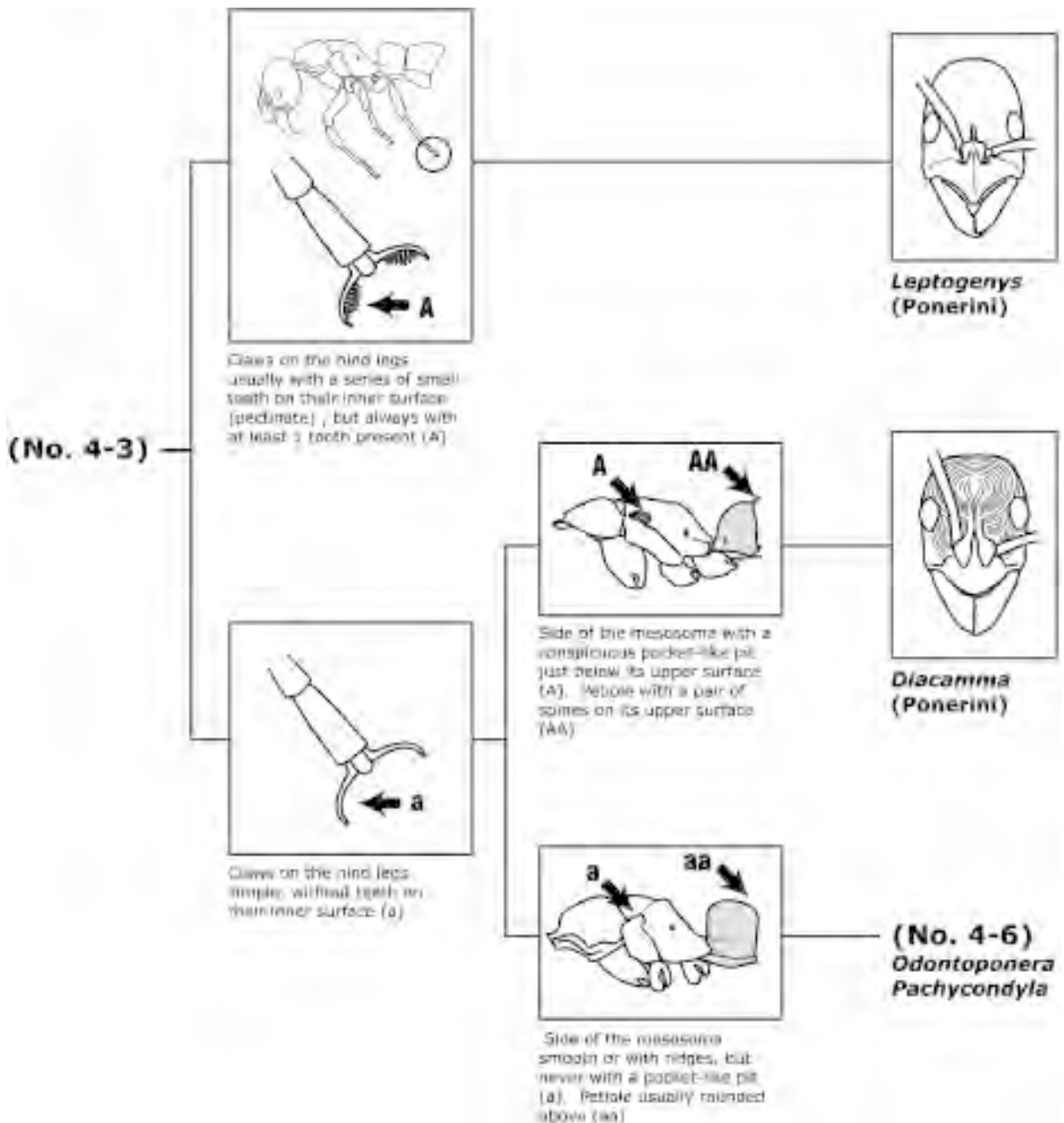
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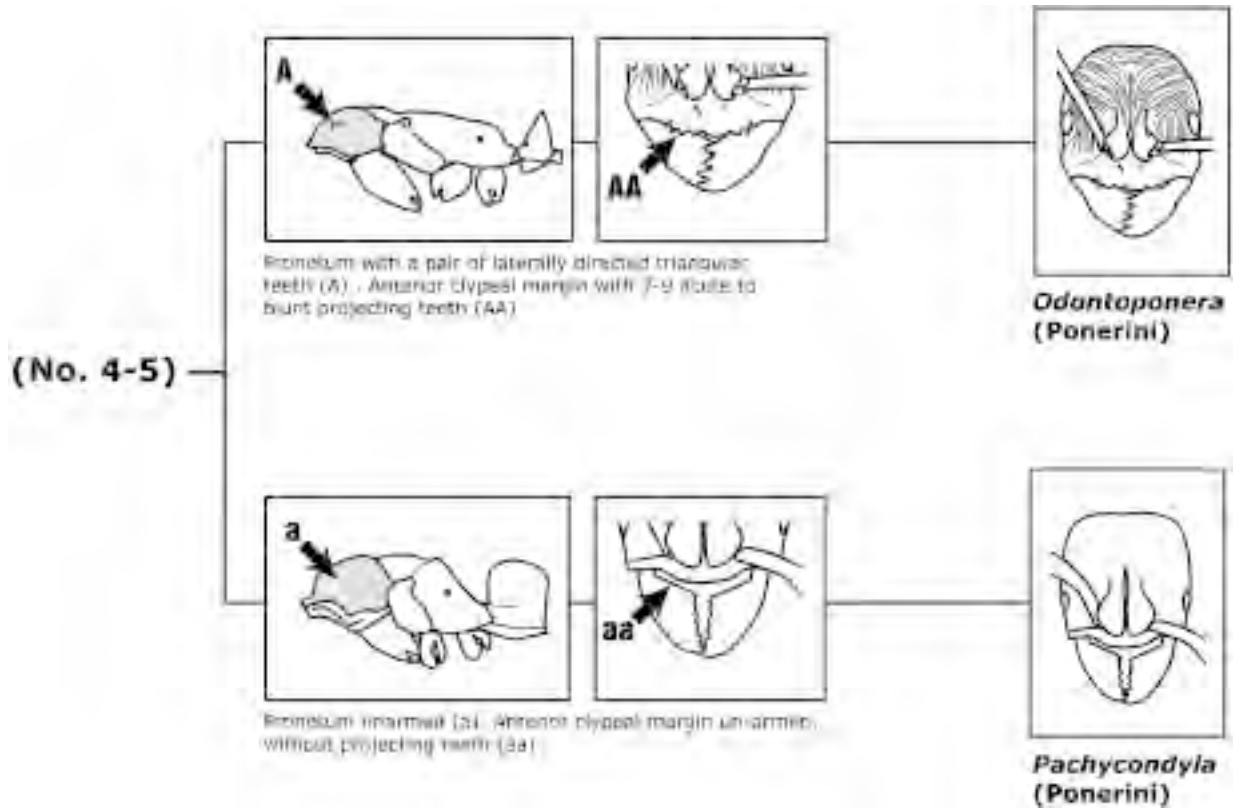
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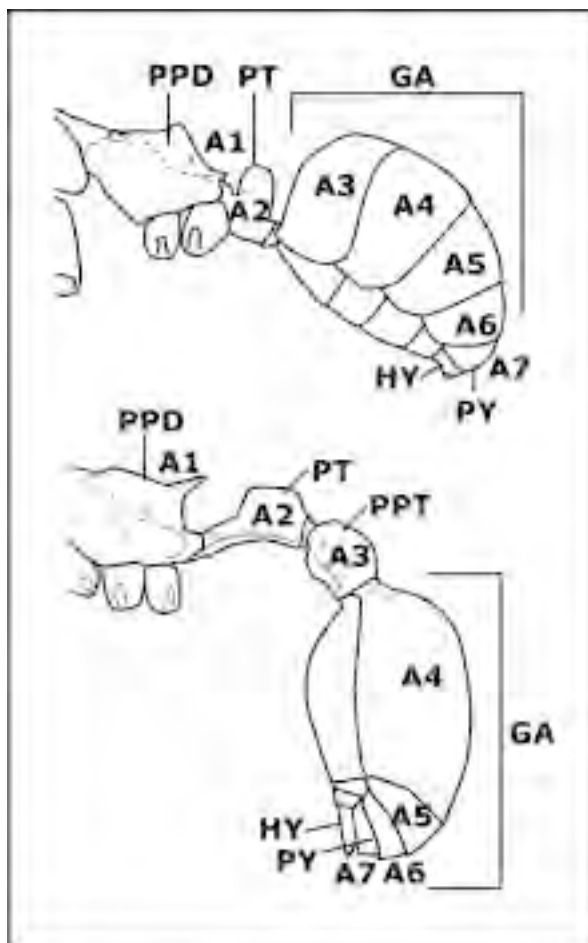


Glossary of Ant Morphology

Abdomen

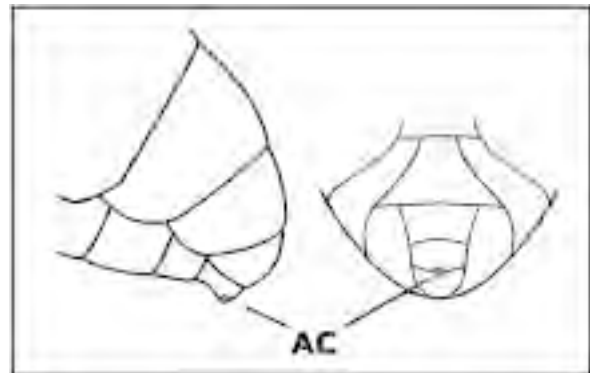
The abdomen in worker ants consists of seven visible segments (A1-7). The first abdominal segment is the propodeum (PPD, A1), which immovably fused to the thorax. The second abdominal segment is the petiole (PT, A2). Abdominal segment 3 is the first gastral segment when it is full-sized and broadly articulated to the following segment (A3), but when reduced and isolated it is called the postpetiole (PPT). Abdominal segment 3 or 4 through to 7 is called the gaster (GA). The last visible abdominal tergite (A7) is the pygidium (PY), and the last visible sternite is the hypopygium (HY).

See Petiole.



Acidopore (AC)

It is the orifice of the formic acid projecting system, which is formed from apex of the hypopygium, appearing a short nozzle, generally with a fringe of short setae.



Alitrunk (Mesosoma)

The alitrunk consists of the three segments of the true thorax (pro-, meso-, and metathorax) to which is fused the propodeum (the tergite of the first abdominal segment), to form a single unit (AL).

Pronotum (PN): The dorsal sclerite of the prothorax. In ants, the pronotum extends across to dorsum and down the sides of the prothorax.

Propleuron (PR): The lateral part of the prothorax. In ants, the propleuron is concealed by the lateral part of the propleuron.

Mesonotum (MS): The dorsal part of the mesothorax. In ants, the mesonotum may be separated from the pronotum by the promesonotal suture (PMS), or may be fused to it to form a single sclerite, the promesonotum (prs).

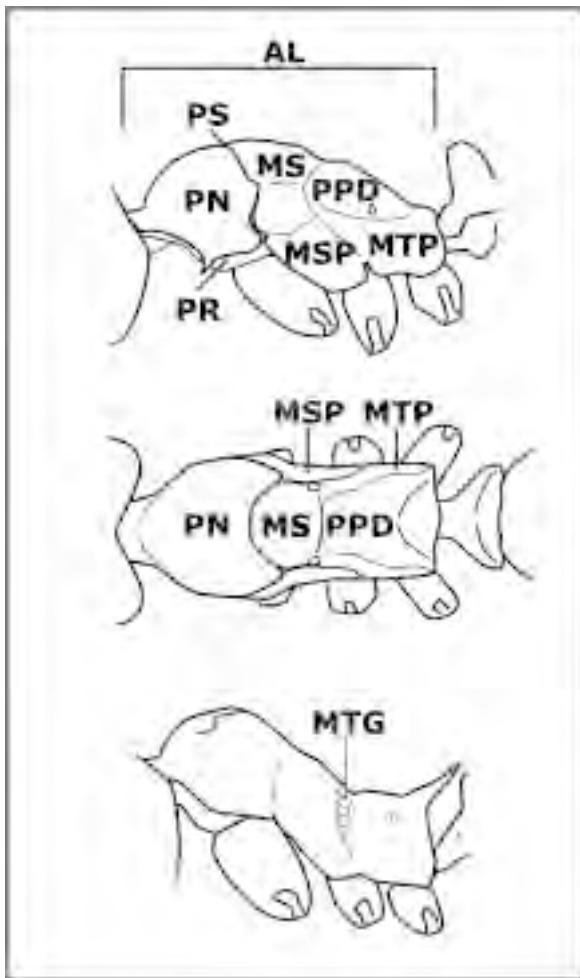
Mesopleuron (MSP): The lateral and ventral part of the mesothorax. The mesopleuron may consist of a single sclerite or may be divided by a transverse groove into an upper and a lower part .

Metanotum (MTN): The dorsal sclerite of the metathorax. In ants, the metanotum may be reduced, or obliterated.

Metanotal groove (MTG): In ants, the mesonotum and propodeum are often separated by a transverse groove or impression (Metanotal groove) representing the last vestige of the metanotum.

Metapleuron (MTP): The lateral and ventral part of the metathorax. In ants, the metapleuron is located posteriorly on the side of the alitrunk, below the level of the propodeum. The metapleuron bears metapleural gland (MG).

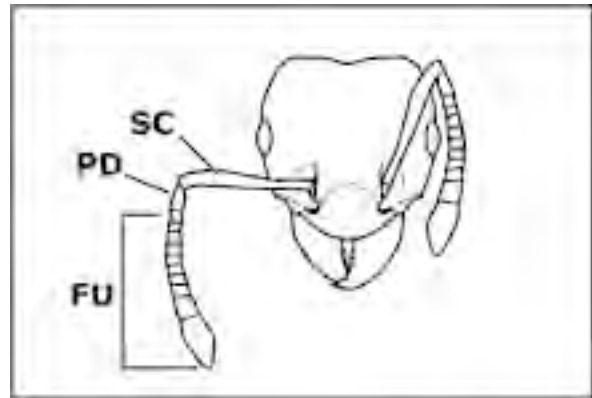
See metapleural gland



Antenna

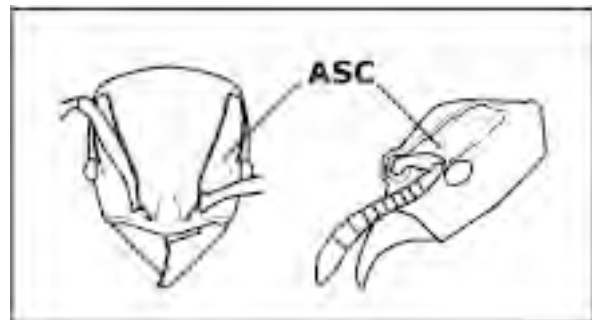
It is a paired segmented sensory appendage of the head between the compound eyes, which consists

of three parts, scape (SC), pedicel (PD) and funiculus (= flagellum, FU). The antenna in ants consists of 4-12 segments. The funicular segments may be filiform or enlarged to form a club.



Antennal scrobe (ASC)

It is a groove, impression, or excavation in the side of the head, which runs above or below the eye, for reception of antennal scapes.



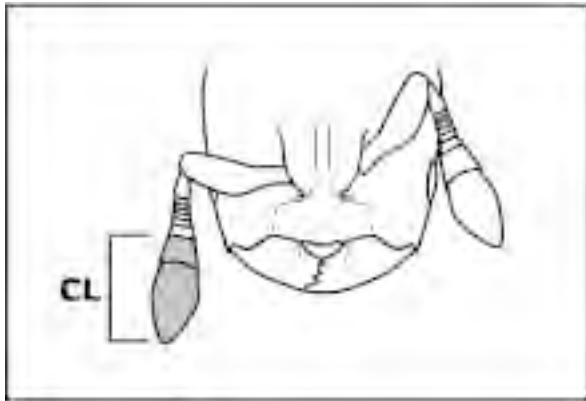
Antennal socket (insertion)

The scape articulates with the head in the antennal socket (ASO). In ants, the antennal sockets usually are overhung and concealed the fronta lobe, but in some the fronta lobe absent or reduce so that they are exposed.



Club (CL)

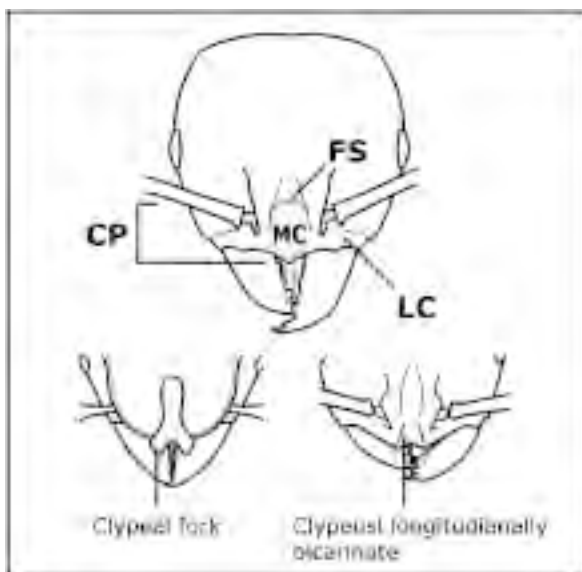
The enlarged apical funicular segments of an antenna. In ants, apical 1-4 segments may be enlarged to form a club.



Clypeus (CP)

Anterior sclerite of the dorsal head, bounded posteriorly by the fronto-clypeal suture (= posterior clypeal margin or border, FS). The anterior clypeal margin usually forms the anterior margin of the head in full-face view. The body of the clypeus consists of median portion and a pair of lateral portions (MC, LC). The median portion of the clypeus may be equipped with one or more longitudinal carinae, or may be variously specialized in shape.

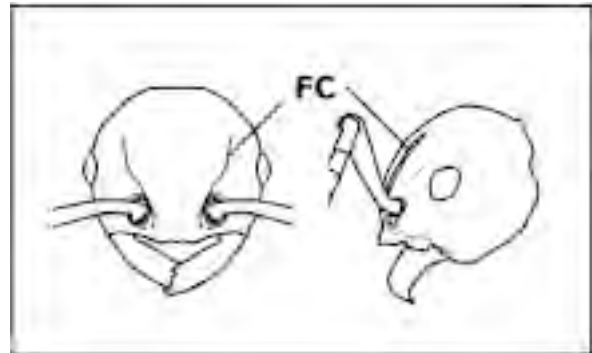
In some taxa the clypeus is very reduced and extremely narrow from front to back.



Frontal carina (FC)

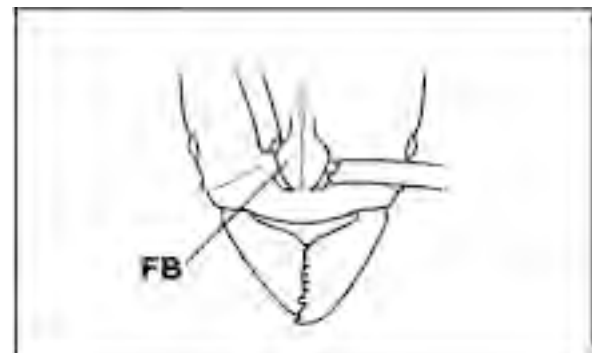
A pair of longitudinal ridges on the head, located dorsally behind the clypeus and between the antennal sockets. Commonly the frontal carinae anteriorly are expanded into the frontal lobes.

See Frontal lobes



Frontal lobe (FB)

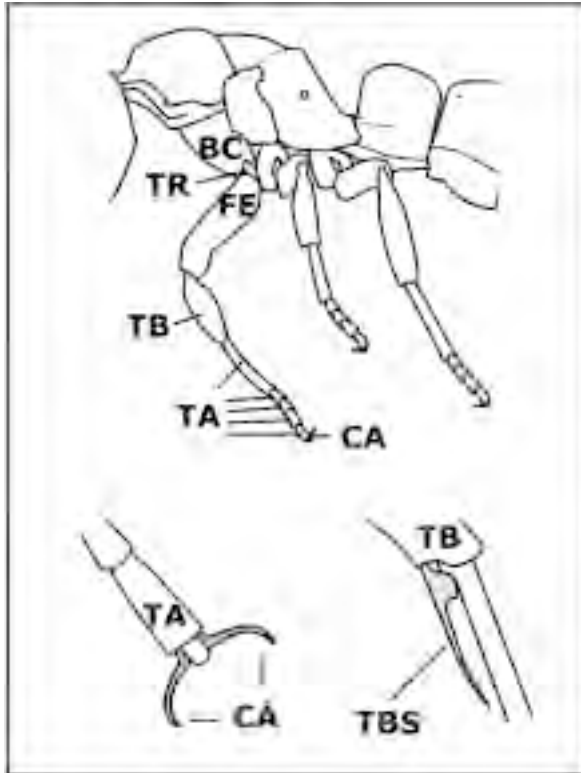
The frontal lobes commonly are extensions, which partially or entirely cover and conceal the antennal sockets.



Leg segments

Each leg consists of a basal coxa (BC) that articulates with the alitrunk, followed in order by a trochanter (TR), femur (FE), a tibia (TB), and a tarsus (TA), the last consisting of five small segments and terminating apically in a pair of claws (CA).

Tibial spur (TBS) A socketed spur located at the apex of each tibia. The forelegs have a single pectinate tibial spur, modified into an antennal cleaner (strigil). The middle and hind legs may each have two, one, or no spurs present.



Mandible (MD)

The paired, heavily sclerotized appendage of the mouthparts between the labrum and maxilla (See Mouth parts). In ants, the mandibular margins usually form a triangular or subtriangular shape in full-face view, but in some become from elongate-triangular to linear mandibles. Extremely curved mandibles, usually quite short and with few or no teeth are termed falcate.

Apical margin (=masticatory margin, MA): In full-face view, with the mandibles closed, the apical margin forms inner margin or border of each mandibular blade, and is usually armed with teeth.

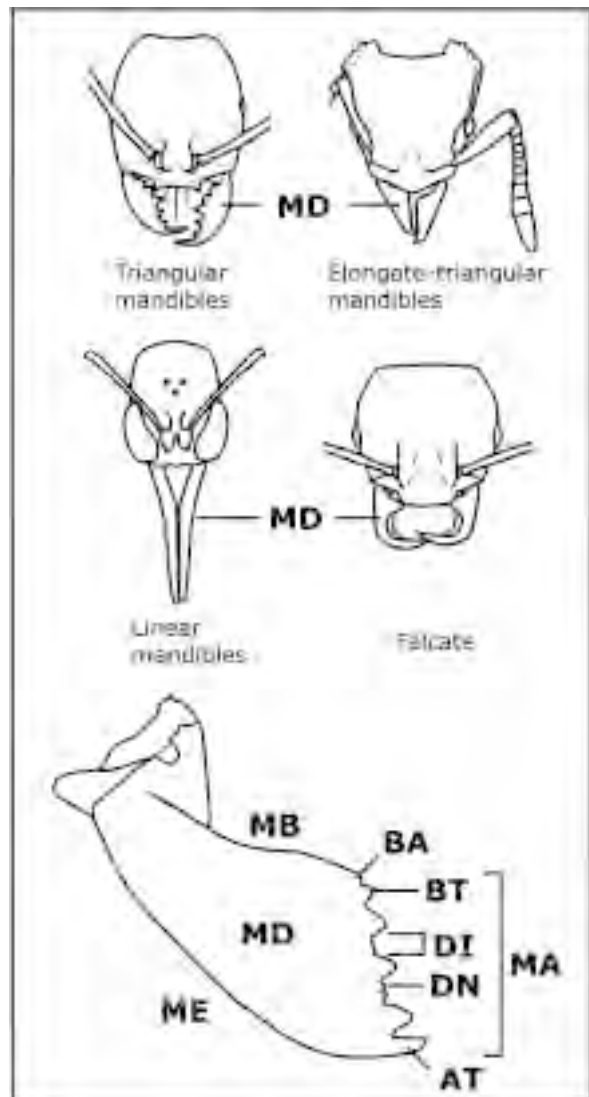
Basal margin (MB): The basal margin of each mandible is transverse or oblique margin closest to an anterior clypeal margin. The apical and basal margins may join through a curve, or meet in an angle (Basal angle, BA). When the mandibles are narrow or linear, the basal angle may be lost. In a few taxa teeth may occur on the basal margin, but in most this margin is unarmed.

External margin (=lateral margin, ME): The external margin of each mandible forms its outer border.

Teeth (T): Teeth are usually sharp and triangular in shape but may be rounded (crenulate), long, narrow, and spine-like (spiniform), or peg-like. The tooth at or nearest to the basal angle is the basal tooth (BT), and the distalmost tooth is apical tooth (AT). When teeth or a combination of teeth and denticles are present, the mandible is dentate. If only tiny denticles occur the mandible is denticulate, and if the margin lacks teeth and denticles it is edentate.

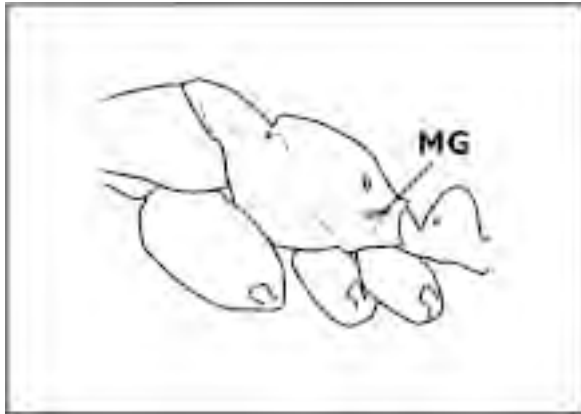
Denticles (DN): Denticles are short or very reduced acute teeth.

Diastema (DI): A diastema is a gap in a row of teeth.



Metapleural gland (MG)

The metapleural gland is an exocrine gland whose orifice is usually situated in the posteroventral corner of the side of the alitrunk, above the level of the metacoxa and below the level of the propodeal spiracle.



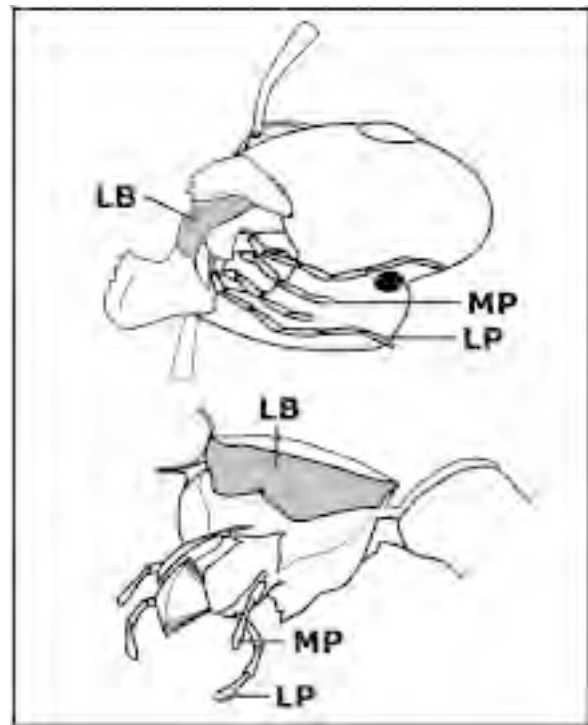
Mouthparts

The appendages of the head used for feeding, including the labrum, hypopharynx, mandibles, maxillae, and labium.

Maxillary palps (MP): The segmented sensory palps of the maxillae. Each palp may have at most 6 segments but these are variously reduced in number in different ant groups.

Labial palps (LP): The segmented sensory palps of the abium. Each palp may have at most 4 segments but these are variously reduced in number in different ant groups. A way of indicating the number of segment in the maxillary and labial palps is termed as Palp Formula (PF). The number of maxillary palp segments is given first, the number of labial palp segments second.

Labrum (LB): Mouthpart sclerite that hinges on the anterior margin of the clypeus and usually folds back and down over the apices of the maxillae and labium when the mouthparts are not in use.



Occipital carina (OC)

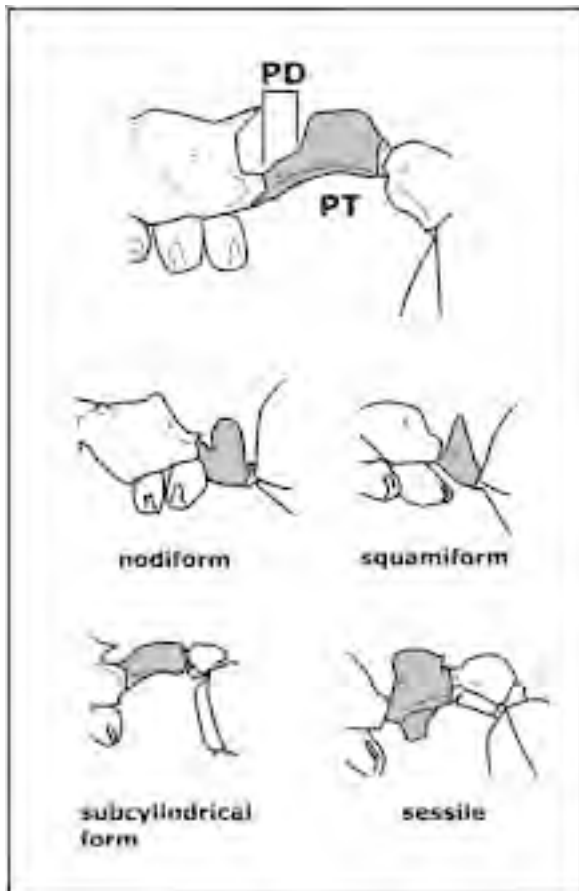
A ridge on the posterior surface of the head that separates the occiput from the vertex and gena.



Petiole (PT)

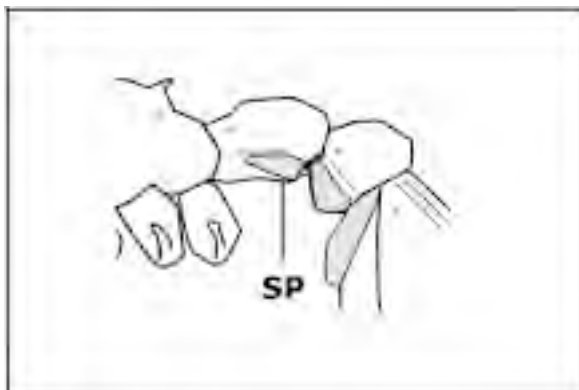
The second abdominal segment (see Abdomen). The petiole takes the form of a node (nodiform) or of a scale (squamiform), but in some taxa it may be represented by only a narrow, subcylindrical segment.

Peduncle (PD): The relatively narrow anterior section of the petiole. when the peduncle is present, the petiole is termed pedunculate. When the peduncle is absent, so that the node or scale of the petiole immediately follows the articulation with propodeum, the petiole is termed sessile.



Spongiform (SP)

Specialized sponge-like external cuticular tissue, distributed mainly about the waist segments in some groups of ants.



Genus list of Bornean Ants

Subfamily **Aenictinae**

Tribe **Aenictini**

Genus *Aenictus* Shuckard 1840

Type species: *Aenictus ambiguous*, by original designation.

Taxonomic Reference

Shuckard, W. E. 1840. Monograph of the Dorylidae, a family of the Hymenoptera Heterogyna. *Ann. Mag. Nat. Hist.* 5: 258-271.

Wilson, E.O. 1964 The true army ants of the Indo-Australian area. *Pacific Insects* 6: 427-483

Biology: Army ants (Predators of other ants)

Subfamily **Cerapachyinae**

Tribe **Cerapachyini**

Genus *Cerapachys* Smith 1857

Type species: *Cerapachys antennatus*, designated by Bingham (1903).

Taxonomic References

Smith, F. 1857. Catalogue of the hymenopterous insects collected at Sarawak, Borneo; Mount Ophir, Malacca; and at Singapore, by A. R. Wallace. *J. Proc. Linn. Soc. London Zool.* 2: 42-88.

Brown, W.L., Jr. 1975 Contributions toward a reclassification of the Formicidae. 5. Ponerinae, tribes Platythyreini, Cerapachyini, Cyliandromyrmecini, Acanthostichini, and Aenictogitini. *Search Agriculture 5: Entomology (Ithaca)* 15 : 1-115

Biology: Army ants (Predators of other ants)

Subfamily **Dolichoderinae**

Tribe **Dolichoderini**

Genus *Bothriomyrmex* Emery 1869

Type species: *Bothriomyrmex costae* Emery, by monotypy.

Taxonomic Reference

Emery, C. 1869. Descrizione di una nuova formica italiana. *Ann. Mus. Zool. R. Univ. Napoli* 5: 117-118.

Shattuck, S.O. 1992 Generic revision of the ant subfamily Dolichoderinae. *Sociobiology* 21: 1-181

Habitat: Wide variety of habitats, from grasslands to lowland rain forests. Nests in soil or in rotten wood

Biology: Foraging on ground and trees. Some are temporary social parasites of *Tapinoma* and *Iridomyrmex*.

Genus *Dolichoderus* Lund 1831

Type species: *Formica attelaboides*, by monotypy.

Taxonomic References

Lund, P. W. 1831. Lettre sur les habitudes de quelques fourmis du Bresil, adressee a M. Audouin. *Ann. Sci. Nat.* 23: 113-138.

Shattuck, S.O. 1992 Generic revision of the ant subfamily Dolichoderinae. *Sociobiology* 21: 1-181

Habitat: Arboreal

Biology: Generalized foragers, tend homopteras

Genus *Iridomyrmex* Mayr 1862

Type species: *Formica detecta*, designated by Bingham (1903).

Taxonomic Reference

Mayr, G. 1862. Myrmecologische Studien. *Verh. Zool.-Bot. Ges. Wien* 12: 649-776.

Shattuck, S.O. 1992 Generic revision of the ant subfamily Dolichoderinae. *Sociobiology* 21: 1-181

Habitat: Wide variety of habitats, from grasslands to lowland rain forests. Nests in soil or in rotten wood

Biology: Generalized foragers, tend homopteras

Genus *Loweriella* Shattuck 1992

Type species: *Loweriella boltoni*, by original designation.

Taxonomic References

Shattuck, S. O. 1992. Generic revision of the ant subfamily Dolichoderinae (Hymenoptera: Formicidae). *Sociobiology* 21: 1-181.

Habitat: Leaf litter in rain forests

Note: The single species, *Loweriella boltoni*, is known from Sarawak and Brunei

Genus *Philidris* Shattuck 1992

Type species: *Formica cordata*, by original designation.

Taxonomic References

Shattuck, S. O. 1992. Review of the dolichoderine ant genus *Iridomyrmex* Mayr with descriptions of three new genera (Hymenoptera: Formicidae). *J. Aust. Entomol. Soc.* 31: 13-18.

Habitat: Forests

Biology: Generalized foragers, tend homopteras

Genus *Tapinoma* Foerster 1850

Type species: *Tapinoma collina*, by monotypy.

Taxonomic Reference

Foerster, A.. 1850. Hymenopterologische Studien. 1. Formicariae. , Aachen. 74 pp.

Shattuck, S.O. 1992 Generic revision of the ant subfamily Dolichoderinae. *Sociobiology* 21: 1-181

Habitat: Wide variety of habitats, from grasslands to lowland rain forests. Nests in soil or in rotten wood

Biology: Generalized foragers, tend homopteras

Note: One species, *T. melanocephalum*, is a tramp species widely distributed in tropical regions

Genus *Technomyrmex* Mayr 1872

Type species: *Technomyrmex strenuus*, by monotypy.

Taxonomic Reference

Mayr, G. 1872. Formicidae Borneenses collectae a J. Doria et O. Beccari in territorio Sarawak annis 1865-1867. *Ann. Mus. Civ. Stor. Nat. Genova* 2: 133-155.

Shattuck, S.O. 1992 Generic revision of the ant subfamily Dolichoderinae. *Sociobiology* 21: 1 181

Habitat: Moist forests. Nests in soil, in branches, or in carton nests under leaves or tree trunks.

Biology: Generalized foragers, tend homopteras

Note: One species, *T. albipes*, is a tramp species widely distributed in tropical regions

Subfamily **Dorylinae**

Tribe **Dorylini**

Genus *Dorylus* Fabricius 1793

Type species: *Vespa helvola*, by monotypy.

Taxonomic Reference

Fabricius, J. C.. 1793. Entomologia systematica emendata et aucta. Vol. 2. Christ. Gottl. Proft, Hafniae. 519 pp.

Wilson, E.O. 1964 The true army ants of the Indo-Australian area. Pacific Insects 6: 427-483

Biology: Army ants. Generalized predators

Subfamily **Formicinae**

Tribe **Brachymyrmecini**

Genus *Cladomyrma* Wheeler 1920

Type species: *Aphomyrma hewitti*, by original designation.

Taxonomic Reference

Wheeler, W. M. 1920 The subfamilies of Formicidae, and other taxonomic notes. *Psyche* 27: 46-55.

Agosti, D. 1991 Revision of the Oriental ant genus *Cladomyrma*, with an out-line of the higher classification of the Formicinae Systematic Entomology 16: 293-310

Habitat: Nests in live pithy

Biology: Generalized foragers. Tend cocooids (Pseudococcidae) inside the nest hollows.

Tribe **Bregmatomyrmini**

Genus *Bregmatomyrma* Wheeler, 1929

Type species: *Bregmatomyrma carnosus* Wheeler, by original designation.

Taxonomic Reference

Wheeler, W. M. 1929. Three new genera of ants from the Dutch East Indies. *Amer. Mus. Nov.* 349: 1-8.

Note: Only single species, *B. carnosus*, (queen only) is known from Borneo.

Tribe **Camponotini**

Genus *Camponotus* Mayr 1861

Type species: *Formica ligniperda* Latreille, designated by Bingham (1903).

Taxonomic Reference

Mayr, G. 1861 Die Europ%ischen Formiciden. (Ameisen.), Vienna. 80 pp.

Habitat: Nests in ground, in dead wood, or in trees.

Biology: Generalized foragers.

Genus *Echinopla* Smith 1857

Type species: *Echinopla melanarctos*, designated by Wheeler (1911).

Taxonomic Reference

Smith, F. 1857 Catalogue of the hymenopterous insects collected at Sarawak, Borneo; Mount Ophir, Malacca; and at Singapore, by A. R. Wallace. *J. Proc. Linn. Soc. London Zool.* 2: 42-88.

Habitat: Arboreal

Biology: Foraging on trees

Genus *Polyrhachis* Smith 1857

Type species: *Formica bihamata*, by original designation.

Taxonomic Reference

Smith, F. 1857 Catalogue of the hymenopterous insects collected at Sarawak, Borneo; Mount Ophir, Malacca; and at Singapore, by A. R. Wallace. *J. Proc. Linn. Soc. London Zool.* 2: 42-88.

Habitat: Many arboreal. some in silk-woven leaf nests.

Biology: Generalized foragers

Tribe **Gesomyrmecini**

Genus *Gesomyrmex* Mayr 1868

Type species: *Gesomyrmex hoernesii*, by monotypy.

Taxonomic Reference

Mayr, G. 1868 Die Ameisen des baltischen Bernsteins. *Beitr. Naturk. Preuss. K. Physik.-Oekon. Ges. Koenigsberg* 1: 1-102.

Habitat: Arboreal

Tribe **Lasiini**

Genus *Euprenolepis* Emery 1906

Type species: *Prenolepis procera*, by original designation.

Taxonomic Reference

Emery, C. 1906 Note sur *Prenolepis vividula* Nyl. et sur la classification des especes du genre *Prenolepis*. *Ann. Soc. Entomol. Belgique* 50: 130-134.

Genus *Paratrechina* Motschoulsky 1863

Type species: *Paratrechina currens*, designated by Wheeler (1911).

Taxonomic Reference

Motschoulsky, V. de. 1863 Essai d'un catalogue des insectes de l'île Ceylan. *Bull. Soc. Imp. Nat. Moscou* 36: 1-153.

Habitat: Nests in open soil or under rocks or other objects, or in rotten wood on the ground.

Biology: Generalized foragers

Genus *Pseudolasius* Emery 1887

Type species: *Formica familiaris*, designated by Bingham (1903).

Taxonomic Reference

Emery, C. 1887 Catalogo delle formiche esistenti nelle collezioni del Museo Civico di Genova. Parte terza. Formiche della regione Indo-Malese e dell'Australia. *Ann. Mus. Civ. Stor. Nat. Genova* (2)4(24): 209-258.

Habitat: Nest in soil under rocks or logs or in rotten wood on the ground.

Biology: Cryptic foragers. Tend homopterans

Tribe **Myrmoteratini**

Genus *Myrmoteras* Forel 1893

Type species: *Myrmoteras binghamii*, by monotypy.

Taxonomic Reference

Forel, A. 1893 Note preventive sur un nouveau genre et une nouvelle espece de formicide (camponitide). *Ann. Soc. Entomol. Belgique* 37: 607-608.

Moffett, M.W. 1985 Revision of the genus *Myrmoteras*. *Bulletin of the Museum of Comparative Zoology* 151: 1-53

Agosti, D. 1992 Revision of the ant genus *Myrmoteras* of the Malay Archipelago. *Revue Suisse de Zoologie* 99: 405-429

Habitat: Epigaeic

Biology: Preadators on forest floor

Tribe **Oecophyllini**

Genus *Oecophylla* Smith 1860

Type species: *Formica virescens*, designated by Bingham (1903).

Taxonomic Reference

Smith, F. 1860. Catalogue of hymenopterous insects collected by Mr. A. R. Wallace in the Islands of Bachian, Kaisaa, Amboyna, Gilolo, and at Dory in New Guinea. *J. Proc. Linn. Soc. London Zool.* 5: 93-143.

Habitat: Nesting in arboreal, silk-woven leaf nests.

Biology: Predator, tend homopterans.

Tribe **Plagiolepidini**

Genus *Acropyga* Roger 1862

Type species: *Acropyga (Atopodon) inezae* Forel, designated by Wheeler (1913).

Taxonomic Reference

Roger, J. 1862. Einige neue exotische Ameisen-Gattungen und Arten. *Berl. Entomol. Z.* 6: 233-254.

Habitat: Hypogaeic

Biology: Tend coccids on the roots of plants

Genus *Anoplolepis* Santschi 1914

Type species: *Formica longipes* Jerdon, by monotypy.

Taxonomic Reference

Santschi, F. 1914. Formicidae. Voyage de Ch. Alluaud et. R. Jeannel en Afrique Orientale (1911-1912). Resultats scientifiques. Hymenoptera 2: 41-148.

Habitat: Nesting in soil

Biology: Generalized foragers

Genus *Lepisiota* Santschi 1926

Type species: *Plagiolepis rothneyi*, by original designation.

Taxonomic Reference

Santschi, F. 1926 Trois notes myrmecologiques. *Ann. Soc. Entomol. France* 95: 13-28.

Biology: Generalized foragers

Genus *Plagiolepis* Mayr 1861

Type species: *Formica pygmaea*, by monotypy.

Taxonomic Reference

Mayr, G. 1861. Die Europäischen Formiciden. (Ameisen.), Vienna. 80 pp.

Biology: Generalized foragers

Subfamily **LEPTANILLINAE**

Tribe **Anomalomyrmini**

Genus *Anomalomyrma* Taylor 1990, in Bolton 1990

Type species: *Anomalomyrma taylori* Bolton, by original designation.

Taxonomic Reference

Bolton, B. 1990. The higher classification of the ant subfamily Leptanillinae (Hymenoptera: Formicidae).
Syst. Entomol. 15: 267-282.

Habitat: Nesting in soil

Biology: Cryptic predators

Genus *Protanilla* Taylor 1990, in Bolton 1990

Type species: *Protanilla rafflesii*, by original designation.

Taxonomic Reference

Bolton, B. 1990 The higher classification of the ant subfamily Leptanillinae (Hymenoptera: Formicidae).
Syst. Entomol. 15: 267-282.

Habitat: Nesting in soil or in rotten wood

Biology: Cryptic predators

Tribe **Leptanillini**

Genus *Leptanilla* Emery 1870

Type species: *Leptanilla revelierii*, by monotypy.

Taxonomic Reference

Emery, C. 1870. Studi mirmecologici. Boll. Soc. Entomol. Ital. 2: 193-201.

Baroni Urbani, C. 1977. Materiali per una revisione della sottofamiglia Leptanillinae Emery. Entomologica
Basilienica 2: 427-488

Habitat: in soil

Biology: Cryptic mass predators (of centipedes)

Subfamily **MYRMICINAE**

Tribe **Basicerotini**

Genus *Eurhopalothrix* Brown & Kempf 1961

Type species: *Rhopalothrix bolau*, by original designation.

Taxonomic Reference

Brown, W. L. and W. W. Kempf. 1961 The type species of the ant genus Eurhopalothrix. *Psyche* 67: 44.

Taylor, R.W. 1968 Notes on the Indo-Australian basicerotine ants. Australian Journal of Zoology 16: 333-348

Habitat: Nesting in leaf litter

Biology: Predators

Tribe **Cataulacini**

Genus *Cataulacus* Smith 1853

Type species: *Cataulacus taprobanae*, designated by Bingham (1903).

Taxonomic Reference

Smith, F. 1853. Monograph of the genus *Cryptocerus*, belonging to the group *Cryptoceridae* - family *Myrmicidae* - division *Hymenoptera Heterogyna*. *Trans. Entomol. Soc. Lond.* (2)2(1854): 213-228.

Bolton, B. 1974 A revision of the Palaeotropical arboreal ant genus *Cataulacus* F. Smith. *Bulletin of the British Museum (Natural History) (Entomology)* 30: 1-105

Habitat: Arboreal, nesting in plant cavities

Tribe **Crematogastrini**

Genus *Crematogaster* Lund 1831

Type species: *Formica scutellaris*, designated by Bingham (1903).

Taxonomic Reference

Lund, P. W. 1831 Lettre sur les habitudes de quelques fourmis du Bresil, adressee a M. Audouin. *Ann. Sci. Nat.* 23: 113-138.

Habitat: Arboreal, nesting in hollow tree trunks and branches. Some in soil

Biology: Generalized foragers

Tribe **Dacetoniini**

Genus *Pyramica* Roger 1862

Type species: *Pyramica gundlachi*, by monotypy.

Taxonomic Reference

Roger, J. 1862 Einige neue exotische Ameisen-Gattungen und Arten. *Berl. Entomol. Z.* 6: 233-254.

Bolton, B. 1999 Ant genera of the tribe *Dacetoniini* (Hymenoptera: Formicidae). *Journal of Natural History* 33: 1639-1689

Habitat: Nesting in leaf litter

Biology: Predators, mainly of collembolans

Genus *Strumigenys* Smith 1860

Type species: *Strumigenys mandibularis*, by monotypy.

Taxonomic Reference

Smith, F. 1860. Descriptions of new genera and species of exotic Hymenoptera. *J. Entomol.* 1: 65-84.

Bolton, B. 1999 Ant genera of the tribe *Dacetoniini* (Hymenoptera: Formicidae). *Journal of Natural History* 33: 1639-1689

Habitat: Nesting in leaf litter

Biology: Predators, mainly of collembolans

Tribe **Formicoxenini**

Genus *Cardiocondyla* Emery 1869

Type species: *Cardiocondyla elegans*, by monotypy.

Taxonomic Reference

Emery, C. 1869 Enumerazione dei Formicidi che rinvenngonsi nei contorni di Napoli. *Ann. Accad. Asp. Nat.* (2)2: 1-26.

Habitat: Nesting in ground

Biology: Generalized forage on the ground surface

Genus *Dilobocondyla* Santschi 1910

Type species: *Atopomyrmex selebensis*, designated by Wheeler (1911).

Taxonomic Reference

Santschi, F. 1910 Deux nouvelles fourmis du Tonkin. *Naturaliste* (2)32: 283-284.

Habitat: Arboreal, nesting in twigs.

Genus *Paratopula* Wheeler 1919

Type species: *Atopomyrmex ceylonicus*, by original designation.

Taxonomic Reference

Wheeler, W. M. 1919 The ants of Borneo. *Bull. Mus. Comp. Zool. Harvard Coll.* 63: 43-147.

Bolton, B. 1988 A review of *Paratopula* Wheeler, a forgotten genus of myrmicine ants. *Entomologist's Monthly Magazine* 124: 125-143

Habitat: Arboreal (?)

Genus *Rotastruma* Bolton 1991

Type species: *Rotastruma recava*, by original designation.

Taxonomic Reference

Bolton, B. 1991. New myrmicine ant genera from the Oriental region (Hymenoptera: Formicidae). *Syst. Entomol.* 16: 1-13.

Habitat: Arboreal

Biology: Foraging on tree

Genus *Vombisidris* Bolton 1991

Type species: *Vombisidris philax*, by original designation.

Taxonomic Reference

Bolton, B. 1991. New myrmicine ant genera from the Oriental region (Hymenoptera: Formicidae). *Syst. Entomol.* 16: 1-13.

Habitat: Arboreal

Biology: Foraging on tree

Tribe **Melissotarsini**

Genus *Rhopalomastix* Forel 1900

Type species: *Rhopalomastix rothneyi*, by monotypy.

Taxonomic Reference

Forel, A. 1900 Un nouveau genre et une nouvelle espece de myrmicide. *Ann. Soc. Entomol. Belgique* 44: 24-26.

Habitat: Nesting under bark (?)

Biology: foraging on under bark, or on low vegetation

Tribe **Meranoplini**

Genus *Meranoplus* Smith 1853

Type species: *Cryptocerus bicolor*, designated by Bingham (1903).

Taxonomic References

Smith, F. 1853. Monograph of the genus *Cryptocerus*, belonging to the group *Cryptoceridae* - family *Myrmicidae* - division *Hymenoptera Heterogyna*. *Trans. Entomol. Soc. Lond.* (2)2(1854): 213-228.

Habitat: Nesting in the ground

Biology: Scavengers (some specialize on seeds)

Tribe **Metaponini**

Genus *Liomyrmex* Mayr 1865

Type species: *Myrmica caeca*.

Taxonomic References

Mayr, G.. 1865 Reise der Oesterreichischen Fregatte *Novara* um die Erde in den Jahren 1857, 1858, 1859, unter den befehlen des Commodore B. von Wuellerstorff-Urbair. Zoologischer Theil. Formicidae., Vienna. 119 pp.

Ettershank, G. 1966 A generic revision of the world Myrmicinae related to *Solenopsis* and *Pheidologeton*. *Australian Journal of Zoology* 14: 73-171

Rigato, F. & B. Bolton 2001 The ant genus *Liomyrmex*: a review (*Hymenoptera Formicidae*). *Boll Soc. entomol. ital.*, 133(3):247-256.

Habitat: Nesting under bark, or in rotten woods

Genus *Metapone* Forel 1911

Type species: *Metapone greeni*, by monotypy.

Taxonomic References

Forel, A. 1911 Sur le genre *Metapone* n.g. nouveau groupe des formicides et sur quelques autres formes nouvelles. *Rev. Suisse Zool.* 19: 445-459.

Habitat: Nesting in hollow twigs, or in rotten woods

Biology: Predators of termites

Genus *Vollenhovia* Mayr 1865

Type species: *Vollenhovia punctatostriata*, by monotypy.

Taxonomic References

Mayr, G.. 1865 Reise der Oesterreichischen Fregatte *Novara* um die Erde in den Jahren 1857, 1858, 1859, unter den befehlen des Commodore B. von Wuellerstorff-Urbair. Zoologischer Theil. Formicidae. , Vienna. 119 pp.

Habitat: Many nesting under bark in logs

Biology: Predators (of termites)

Tribe **Myrmecinini**

Genus *Myrmecina* Curtis 1829

Type species: *Myrmecina latreillii*, by monotypy.

Taxonomic References

Curtis, J. 1829 British entomology; being illustrations and descriptions of the genera of insects found in Great Britain and Ireland. Vol. 6:242-288. , London.

Habitat: Nesting in soil

Biology: Predators of mites

Genus *Acanthomyrmex* Emery 1893

Type species: *Acanthomyrmex luciolae* Emery, designated by Bingham (1903).

Taxonomic References

Emery, C. 1893. Untitled. *Bull. Bimens. Soc. Entomol. France* 61: cclxxv-cclxxvii.

Moffett, M.W. 1986 Revision of the myrmicine genus *Acanthomyrmex*. *Bulletin of the Museum of Comparative Zoology* 151: 55-89

Habitat: Nesting in cavities in logs, or in leaf letter

Biology: Seed harvesters (especially of ficus)

Genus *Pristomyrmex* Mayr 1866

Type species: *Pristomyrmex pungens*, by monotypy.

Taxonomic References

Mayr, G. 1866 Diagnosen neuer und wenig gekannter Formiciden. *Verh. Zool.-Bot. Ges. Wien* 16: 885-908.

Habitat: Nesting in rotten wood on the ground, or in soil under stones.

Biology: Generalized foragers.

Tribe Myrmicarini

Genus *Myrmecaria* Saunders 1842

Type species: *Myrmecaria brunnea*, by monotypy.

Taxonomic References

Saunders, W. W. 1842 Descriptions of two hymenopterous insects from northern India. *Trans. Entomol. Soc. Lond.* 3: 57-58.

Habitat: Many Arboreal

Biology: Generalized foragers.

Tribe Phalacromyrmecini

Genus *Ishakidris* Bolton 1984

Type species: *Ishakidris ascitaspis*, by original designation.

Taxonomic References

Bolton, B. 1984 Diagnosis and relationships of the myrmicine ant genus *Ishakidris* gen.n. *Systematic Entomology* 9: 373-382

Habitat: Leaf litter

Note: The single species, *I. ascitaspis*, is known from Winkler bag sample collected in Sarawak.

Tribe Pheidolini

Genus *Aphaenogaster* Mayr 1853

Type species: *Aphaenogaster sardoa* Mayr, designated by Bingham (1903).

Taxonomic References

Mayr, G. 1853 Beitrage zur Kenntniss der Ameisen. *Verh. Zool.-Bot. Ver. Wien* 3: 101-114.

Habitat: Nesting in soil

Biology: Generalized foragers

Genus *Chimaeridris* Wilson 1989

Type species: *Chimaeridris boltoni*, by original designation.

Taxonomic References

Wilson, E. O. 1989 Chimaeridris, a new genus of hook-mandibled myrmicine ants from tropical Asia (Hymenoptera: Formicidae). *Ins. Soc.* 36: 62-69.

Genus *Lophomyrmex* Emery 1892

Type species: *Oecodoma quadrispinosa*, by monotypy.

Taxonomic References

Emery, C. 1892 Sopra alcune formiche raccolte all'Ingegnere L. Bricchetti Robecchi nel paese dei Somali. *Ann. Mus. Civ. Stor. Nat. Genova* (2)12(32): 110-122.

Rigato, F. 1994. Revision of the myrmicine ant genus *Lophomyrmex*, with a review of its taxonomic position. *Systematic Entomology* 19: 47-60

Habitat: Nesting in soil near the base of trees

Biology: General foragers

Genus *Pheidole* Westwood 1839

Type species: *Atta providens*, by monotypy.

Taxonomic References

Westwood, J. O. 1839. An introduction to the modern classification of insects Vol. 2, part 11, pp. 193-224. , London.

Eguchi, K. 2001. A revision of the Bornean species of the ant genus *Pheidole* (Insects: Hymenoptera: Formicidae: Myrmicinae). *Tropics Monograph Series* 2: 1-154

Habitat: Nesting in soil, or in rotten wood

Biology: General foragers

Tribe **Pheidologetonini**

Genus *Oligomyrmex* Mayr 1867

Type species: *Oligomyrmex concinnus*, by monotypy.

Taxonomic References

Mayr, G. 1867. Adnotationes in monographiam formicidarum Indo-Neerlandicarum. *Tijdschr. Entomol.* (2)2(10): 33-117.

Habitat: in soil

Biology: Prey on brood and eggs of termites, or ants

Genus *Pheidologeton* Mayr 1862

Type species: *Oecodoma diversa*, designated by Bingham (1903).

Taxonomic References

Mayr, G. 1862 Myrmecologische Studien. *Verh. Zool.-Bot. Ges. Wien* 12: 649-776.

Habitat: Nesting in soil

Biology: Generalized and mass foragers

Genus *Recurvidris* Bolton 1890

Type species: *Trigonogaster recurvispinosa* Forel, by monotypy. Replacement name for *Trigonogaster* Forel, by Bolton (1992).

Taxonomic References

Forel, A. 1890. *Aenictus-Typhlatta* decouverte de M. Wroughton. Nouveaux genres de formicides. *Ann. Soc. Entomol. Belg. Comptes-rendus Seances* 34: cii-cxiv.

Bolton, B. 1992. A review of the ant genus *Recurvidris*, a new name for *Trigonogaster* Forel. *Psyche* 99: 35-48

Habitat: Nesting in soil

Biology: Generalized foragers

Tribe Solenopsidini

Genus *Anillomyrma* Emery 1913

Type species: *Monomorium decamerum* Emery, by monotypy.

Taxonomic References

Emery, C. 1913 Etudes sur les Myrmicinae. *Ann. Soc. Entomol. Belgique* 57: 250-262.

Bolton, B. 1987 A review of the *Solenopsis* genus-group and revision of Afrotropical *Monomorium* Mayr (Hymenoptera: Formicidae). *Bull. Brit. Mus. (Nat. Hist.) Entomol.* 54: 263-452.

Habitat: Nesting in soil, or in termite nests

Biology: Prey on termites (?)

Genus *Epelysidris* Bolton 1987

Type species: *Epelysidris brocha*, by original designation.

Taxonomic References

Bolton, B. 1987. A review of the *Solenopsis* genus-group and revision of Afrotropical *Monomorium* Mayr (Hymenoptera: Formicidae). *Bull. Brit. Mus. (Nat. Hist.) Entomol.* 54: 263-452.

Habitat: Moss forest, nesting in soil under the moss and rocks.

Note: Only single species, *E. brocha*, is known from Sarawak.

Genus *Monomorium* Mayr 1855

Type species: *Monomorium minutum*, by monotypy.

Taxonomic References

Mayr, G. 1855 Formicina austriaca. Beschreibung der bisher im oesterreichischen Kaiserstaate aufgefundenen Ameisen nebst Hinzufuegung jener in Deutschland, in der Schweiz und in Italien vorkommenden Ameisen. *Verh. Zool.-Bot. Ver. Wien* 5: 273-478.

Bolton, B. 1987 A review of the *Solenopsis* genus-group and revision of Afrotropical *Monomorium* Mayr (Hymenoptera: Formicidae). *Bull. Brit. Mus. (Nat. Hist.) Entomol.* 54: 263-452.

Habitat: Nesting under rocks, under bark, or in rotten branches.

Biology: Scavengers. Seed harvesters

Genus *Solenopsis* Westwood 1840

Type species: *Solenopsis mandibularis*, by monotypy.

Taxonomic References.

Westwood, J. O. 1840 Observations on the genus *Typhlopone*, with descriptions of several exotic species of ants. *Ann. Mag. Nat. Hist.* 6: 81-89.

Bolton, B. 1987 A review of the *Solenopsis* genus-group and revision of Afrotropical *Monomorium* Mayr (Hymenoptera: Formicidae). *Bull. Brit. Mus. (Nat. Hist.) Entomol.* 54: 263-452.

Habitat: Nesting in ground

Biology: Generalized foragers and thief ants

Tribe **Stenammini**

Genus *Calyptomyrmex* Emery 1887

Type species: *Calyptomyrmex beccarii* Emery, by monotypy.

Taxonomic References

Emery, C. 1887 Catalogo delle formiche esistenti nelle collezioni del Museo Civico di Genova. Parte terza. Formiche della regione Indo-Malese e dell'Australia (continuazione e fine). *Ann. Mus. Civ. Stor. Nat. Genova* (2)5(25): 427-473.

Baroni Urbani, C. 1975 Primi reperti del genere *Calyptomyrmex* Emery nel subcontinente Indiano. *Entomologica Basiliensia* 1: 395-411

Habitat: Leaf litter

Genus *Dacatinops* Brown & Wilson 1957

Type species: *Dacatinops cibdelus*, by original designation.

Taxonomic References

Brown, W. L. and E. O. Wilson. 1957. *Dacatinops*, a new ant genus from New Guinea. *Breviora* 77: 1-7.

Taylor, R.W. 1965. A new species of the ant genus *Dacatinops* from Sarawak. *Breviora* 237: 1-4.

Taylor, R.W. 1985. The ants of the Papuanian genus *Dacatinops*. In Ball, G.E. (Ed.). *Taxonomy, Phylogeny and Zoogeography of Beetles and Ants*. 41-67

Genus *Lasiomyrma* Terayama & Yamane 2000

Type species: *Lasiomyrma gedensis* Terayama & Yamane, by original designation

Taxonomic References

Terayama, M. and S. Yamane 2000. *Lasiomyrma*, a new stenammine ant genus from Southeast Asia (Hymenoptera: Formicidae) *Entomological Science* 3(3): 523-527.

Habitat: Nesting in rotten woods

Genus *Lordomyrma* Emery 1897

Type species: *Lordomyrma furcifera*, designated by Wheeler (1911).

Taxonomic References

Emery, C. 1897 Formicidarum species novae vel minus cognitae in collectione Musaei Nationalis Hungarici, quas in Nova Guinea, colonia germanica, collegit L. Biro. *Term. Fuz.* 20: 571-599.

Habitat: Nesting in soil, or in rotten woods

Genus *Mayriella* Forel 1902

Type species: *Mayriella abstinens*, by monotypy.

Taxonomic References

Forel, A. 1902. Fourmis nouvelles d'Australie. *Rev. Suisse Zool.* 10: 405-548.

Habitat: Nesting in soil, or rotten logs

Biology: Foraging in leaf litter

Genus *Proatta* Forel 1912

Type species: *Proatta butteli*, by monotypy.

Taxonomic References

Forel, A. 1912 Descriptions provisoires de genres, sous-genres et especes de formicides des Indes orientales. *Rev.*

Suisse Zool. 20: 761-774.

Habitat: Nesting in soil

Biology: Scavengers

Genus *Tetheamyрма* Bolton 1991

Type species: *Tetheamyрма subspongia*, by original designation.

Taxonomic References

Bolton, B. 1991 New myrmicine ant genera from the Oriental region (Hymenoptera: Formicidae). *Syst. Entomol.* 16: 1-13.

Habitat: Nesting in leaf litter

Note: Only single species, *T. subspongia*, is known from Sabah, Poring.

Tribe **Tetramoriini**

Genus *Rhoptromyrmex* Mayr 1901

Type species: *Rhopalomastix rothneyi*, by monotypy.

Taxonomic References

Mayr, G. 1901. Suedafrikanische Formiciden, gesammelt von Dr. Hans Brauns. *Ann. Naturhistor. Mus. Wien* 16: 1-30.

Bolton, B. 1986 A taxonomic and biological review of the tetramoriine ant genus *Rhoptromyrmex*. *Systematic Entomology* 11: 1-17

Habitat: Nesting in soil

Biology: Social parasites (of Pheidole, Tapinoma)

Genus *Secostruma* Bolton 1988

Type species: *Secostruma lethifera*, by original designation.

Taxonomic References

Bolton, B. 1988. *Secostruma*, a new subterranean tetramoriine ant genus (Hymenoptera: Formicidae). *Syst. Entomol.* 13: 263-270.

Habitat: Nesting in soil

Note: Only single species, *S. lethifera*, is known from soil core sample collected in Sabah, Gunong Silam.

Genus *Tetramorium* Mayr 1855

Type species: *Formica caespitum*, designated by Girard (1879).

Taxonomic References

Mayr, G. 1855. Formicina austriaca. Beschreibung der bisher im oesterreichischen Kaiserstaate aufgefundenen Ameisen nebst Hinzufuegung jener in Deutschland, in der Schweiz und in Italien vorkommenden Ameisen. *Verh. Zool.-Bot. Ver. Wien* 5: 273-478.

Bolton, B. 1977. The ant tribe Tetramoriini. The genus *Tetramorium* Mayr in the Oriental and Indo-Australian regions, and in Australia. *Bulletin of the British Museum (Natural History) (Entomology)* 36: 67-151

Habitat: Nesting in soil

Biology: Generalized foragers

Subfamily **PONERINAE**

Tribe **Amblyoponini**

Genus *Amblyopone* Erichson 1842

Type species: *Amblyopone australis* Erichson, by monotypy.

Taxonomic References

Erichson, W. F. 1842. Beitrag zur Insecten-Fauna von Vandiemensland, mit besonderer Beruecksichtigung der geographischen Verbreitung der Insecten. *Arch. Naturgesch.* 8: 83-287.

Brown, W.L., Jr. 1960. Contributions toward a reclassification of the Formicidae. 3. Tribe Amblyoponini. Bulletin of the Museum of Comparative Zoology at Harvard College 122: 145-230

Habitat: nesting in soil under rocks or logs, or in rotten wood

Biology: Cryptic predators (some specialist to prey centipeds)

Genus *Myopopone* Roger 1861

Type species: *Myopopone maculata*, designated by Bingham (1903).

Taxonomic References

Roger, J. 1861. Die Ponera-artigen Ameisen. (Schluss.) *Berl. Entomol. Z.* 5: 1-54.

Brown, W.L., Jr. 1960 Contributions toward a reclassification of the Formicidae. 3. Tribe Amblyoponini. Bulletin of the Museum of Comparative Zoology at Harvard College 122:145-230

Habitat: Nesting in rotten wood or under bark.

Biology: Predator (some specialist predator on millipeds)

Genus *Mystrium* Roger 1862

Type species: *Mystrium mysticum*, by monotypy.

Taxonomic References

Roger, J. 1862. Einige neue exotische Ameisen-Gattungen und Arten. *Berl. Entomol. Z.* 6: 233-254.

Brown, W.L., Jr. 1960 Contributions toward a reclassification of the Formicidae. 3. Tribe Amblyoponini. Bulletin of the Museum of Comparative Zoology at Harvard College 122: 145-230

Habitat: Nesting under rocks or logs on the ground and in leaf litter.

Biology: Predator

Genus *Prionopelta* Mayr 1866

Type species: *Prionopelta punctulata*, by monotypy.

Taxonomic References

Mayr, G. 1866. Myrmecologische Beitrage. *Sitzungsber. K. Wiss. Math.-Naturwiss. Classe* 53: 484-517.

Brown, W.L., Jr. 1960 Contributions toward a reclassification of the Formicidae. 3. Tribe Amblyoponini. Bulletin of the Museum of Comparative Zoology at Harvard College 122: 145-230

Habitat: Nesting under rocks or logs on the ground and in leaf litter.

Biology: Predator (of chilopda)

Tribe **Ectatommini**

Genus *Discothyrea* Roger 1863

Type species: *Discothyrea testacea*, by monotypy.

Taxonomic References

Roger, J. 1863 Die neu aufgeführten Gattungen und Arten meines Formiciden-Verzeichnisses, nebst Ergänzung

einiger früher gegeben Beschreibungen. *Berl. Entomol. Z.* 7: 131-214.

Brown, W.L., Jr. 1958 Contributions toward a reclassification of the Formicidae. 2. Tribe Ectatommini. Bulletin of the Museum of Comparative Zoology at Harvard College 118: 175-362

Habitat: Nesting in open soil, or in soil under rocks, or in rotten wood.

Biology: Specialist predators on arthropod eggs.

Genus *Gnamptogenys* Roger 1863

Type species: *Ponera tornata*, designated by Emery (1911).

Taxonomic References

Roger, J. 1863 Die neu aufgeführten Gattungen und Arten meines Formiciden-Verzeichnisses, nebst Ergänzung einiger früher gegeben Beschreibungen. *Berl. Entomol. Z.* 7: 131-214.

Brown, W.L., Jr. 1958 Contributions toward a reclassification of the Formicidae. 2. Tribe Ectatommini. Bulletin of the Museum of Comparative Zoology at Harvard College 118: 175-362

Habitat: Nesting in rotten logs on the ground.

Biology: Predators (some specialist predators on millipeds)

Genus *Proceratium* Roger 1863

Type species: *Proceratium silaceum*, by monotypy.

Taxonomic References

Roger, J. 1863 Die neu aufgeführten Gattungen und Arten meines Formiciden-Verzeichnisses, nebst Ergänzung einiger früher gegeben Beschreibungen. *Berl. Entomol. Z.* 7: 131-214.

Brown, W.L., Jr. 1958 Contributions toward a reclassification of the Formicidae. 2. Tribe Ectatommini. Bulletin of the Museum of Comparative Zoology at Harvard College 118: 175-362

Habitat: Nesting in soil or rotten wood.

Biology: Specialist predators of arthropod eggs.

Tribe **Platythyreini**

Genus *Platythyrea* Roger 1863

Type species: *Pachycondyla punctata*, designated by Bingham (1903).

Taxonomic References

Roger, J. 1863 Die neu aufgeführten Gattungen und Arten meines Formiciden-Verzeichnisses, nebst Ergänzung einiger früher gegeben Beschreibungen. *Berl. Entomol. Z.* 7: 131-214.

Brown, W. L., Jr. 1975 Contributions toward a reclassification of the Formicidae. V. Ponerinae, tribes Platythyreini, Cerapachyini, Cyndromyrmecini, Acanthostichini, and Aenictogitini. *Search Agric.* (Ithaca N. Y.) 5(1): 1-115

Habitat: Nesting in soil, in rotten wood or in hollow twigs on trees

Biology: Predator (some specialist predators on termites)

Genus *Probolomyrmex* Mayr 1901

Type species: *Probolomyrmex filiformis*, by monotypy.

Taxonomic References

Mayr, G. 1901 Suedafrikanische Formiciden, gesammelt von Dr. Hans Brauns. *Ann. Naturhistor. Mus. Wien* 16: 1-30.

Taylor, R.W. 1965 A monographic revision of the rare tropicopolitan ant genus *Probolomyrmex* Mayr. *Transactions of the Royal Entomological Society of London* 117: 345-365

Brown, W. L., Jr. 1975 Contributions toward a reclassification of the Formicidae. V. Ponerinae, tribes Platythyreini, Cerapachyini, Cylindromyrmecini, Acanthostichini, and Aenictogitini. *Search Agric.* (Ithaca N. Y.) 5(1): 1-115
Habitat: Nesting in soil under rocks, in leaf litter or in rotten wood.
Biology: Cryptic predator

Tribe **Ponerini**

Genus *Anochetus* Mayr 1861

Type species: *Odontomachus ghilianii* Spinola, by monotypy.

Taxonomic References

Mayr, G.. 1861 Die Europ, schen Formiciden. (Ameisen.) , Vienna. 80 pp.

Brown, W.L.,Jr. 1978 Contributions toward a reclassification of the Formicidae. Part 6. Ponerinae, tribe Ponerini, subtribe Odontomachiti. Section B. Genus Anochetus and bibliography. *Studia Entomologica* (N.S.) 20: 549-652

Habitat: Nesting in soil, in termite nests or under logs.

Biology: Predator

Genus *Centromyrmex* Mayr 1866

Type species: *Centromyrmex bohemanni*, by monotypy

Taxonomic References

Mayr, G. 1866 Diagnosen neuer und wenig gekannter Formiciden. *Verh. Zool.-Bot. Ges. Wien* 16: 885-908.

Habitat: Nesting in soil (in or near termite nest)

Biology: Predator of termite

Genus *Cryptopone* Emery 1893

Type species: *Cryptopone testacea*, by monotypy.

Taxonomic References

Emery, C. 1893 Untitled. *Bull. Bimens. Soc. Entomol. France* 61: cclxxv-cclxxvii.

Brown, W.L.,Jr. 1963. Characters and synonymies among the genera of ants. Part 3. Some members of the tribe Ponerini. *Breviora* 190: 1-10

Habitat: Nesting in soil under rocks, or in rotten wood.

Biology: Cryptic predator

Genus *Diacamma* Mayr 1862

Type species: *Ponera rugosa*, designated by Bingham (1903).

Taxonomic References

Mayr, G. 1862 Myrmecologische Studien. *Verh. Zool.-Bot. Ges. Wien* 12: 649-776.

Habitat: Nesting in soil

Biology: Predator

Genus *Emeryopone* Forel 1912

Type species: *Emeryopone buttelreepeni*, by monotypy.

Taxonomic References

Forel, A. 1912 Descriptions provisoires de genres, sous-genres et especes de formicides des Indes orientales. *Rev. Suisse Zool.* 20: 761-774.

Baroni Urbani, C. 1975 Contributo alla conoscenza dei generi Belonopelta Mayr e Leiopelta gen.n. *Mitteilungen*

der Schweizerischen Entomologischen Gesellschaft 48: 295-310

Habitat: Nesting in soil

Biology: Predator

Genus *Harpegnathos* Jerdon 1851

Type species: *Harpegnathos saltator*, by monotypy.

Taxonomic References

Jerdon, T. C. 1851 A catalogue of the species of ants found in southern India. *Madras J. Lit. Sci.* 17: 103-127.

Habitat: Nesting in soil

Biology: Predator

Genus *Hypoponera* Santschi 1938

Type species: *Ponera abeillei*, by original designation.

Taxonomic References

Santschi, F. 1938 Notes sur quelques Ponera. *Bull. Soc. Entomol. France* 43: 78-80.

Habitat: Nesting in soil, in rotten wood, in leaf litter.

Biology: Cryptic predators (some specialist predator on Collembola).

Genus *Leptogenys* Roger 1861

Type species: *Leptogenys falcigera*, designated by Bingham (1903).

Taxonomic References

Roger, J. 1861 Die Ponera-artigen Ameisen. (Schluss.) *Berl. Entomol. Z.* 5: 1-54.

Habitat: Nesting in soil, in rotten wood, in leaf litter.

Biology: Mass foraging predator (some having army ant like habit)

Genus *Myopias* Roger 1861

Type species: *Myopias amblyops*, by monotypy.

Taxonomic References

Roger, J. 1861 Die Ponera-artigen Ameisen. (Schluss.) *Berl. Entomol. Z.* 5: 1-54

Habitat: Nesting in soil, or in rotten wood

Biology: Predator

Genus *Odontomachus* Latreille 1804

Type species: *Formica haematoda*, by monotypy.

Taxonomic References

Latreille, P. A. 1804 Tableau methodique des insectes. Classe huitieme. Insectes, Insecta. *Nouveau Dictionnaire d'Histoire Naturelle* 24: 129-200.

Brown, W.L., Jr. 1976 Contributions toward a reclassification of the Formicidae. Part 6. Ponerinae, tribe Ponerini, subtribe Odontomachiti. Section A. Introduction, subtribal characters, genus *Odontomachus*. *Studia Entomologica* (N.S.) 19: 67-171

Habitat: Nesting in soil, or in rotten wood on the ground.

Biology: Predator

Genus *Odontoponera* Mayr 1862

Type species: *Ponera denticulata*, by monotypy.

Taxonomic References

Mayr, G. 1862 Myrmecologische Studien. *Verh. Zool.-Bot. Ges. Wien* 12: 649-776.

Habitat: Nesting in soil

Biology: Predator

Genus *Pachycondyla* Smith 1858

Type species: *Formica crassinoda*, designated by Emery (1901).

Taxonomic References

Smith, F. 1858 Catalogue of the hymenopterous insects in the collection of the British Museum. 6. Formicidae. , London. 216 pp.

Habitat: Nesting in soil, or in logs

Biology: Predator, scavengers

Genus *Ponera* Latreille 1804

Type species: *Formica coarctata*, designated by Westwood (1840).

Taxonomic References

Latreille, P. A. 1804 Tableau methodique des insectes. Classe huitieme. Insectes, Insecta. *Nouveau Dictionnaire d'Histoire Naturelle* 24: 129-200.

Taylor, R.W. 1967 A monographic revision of the ant genus *Ponera* Latreille. *Pacific Insects Monograph* 13: 1-112

Habitat: Nesting in the soil, in rotten wood, or under bark or moss on rotten logs.

Biology: Cryptic predators

Subfamily **PSEUDOMYRMECINAE**

Tribe **Pseudomyrmecini**

Genus *Tetraponera* Smith 1852

Type species: *Tetraponera atrata*, designated by Wheeler (1911).

Taxonomic References

Smith, F. 1852 Descriptions of some hymenopterous insects captured in India, with notes on their oeconomy, by Ezra T. Downes, Esq., who presented them to the Honourable the East India Company. *Ann. Mag. Nat. Hist.* (2)9: 44-50.

Ward, P. S. 2001 Taxonomy, phylogeny and biogeography of the ant genus *Tetraponera* (Hymenoptera: Formicidae) in the Oriental and Australian regions. *Invert. Taxon.* 15: 589-665.

Habitat: Arboreal, nesting in plants cavities

Biology: Predator (?)