

= Ypresiomyrma =

Ypresiomyrma is an extinct genus of ants in the subfamily Myrmeciinae that was described in 2006 . There are four species described ; one species is from the Isle of Fur in Denmark , two are from the McAbee Fossil Beds in British Columbia , Canada , and the fourth from the Bol'shaya Svetlovodnaya fossil site in Russia . The queens of this genus are large , the mandibles are elongated and the eyes are well developed ; a stinger is also present . The behaviour of these ants would have been similar to that of extant Myrmeciinae ants , such as solitary foraging for arthropod prey and never leaving pheromone trails . The alates were poor flyers due to their size , and birds and animals most likely preyed on these ants . Ypresiomyrma is not assigned to any tribe , and is instead generally regarded as incertae sedis within Myrmeciinae . However , some authors believe Ypresiomyrma should be assigned as incertae sedis within Formicidae .

= = History and classification = =

Fossils of Ypresiomyrma were first studied and described by Bruce Archibald , Stefan Cover and Corrie Moreau of the Museum of Comparative Zoology in Cambridge , Massachusetts . They published their 2006 description of the genus and species in an Annals of the Entomological Society of America journal article . The genus name is a combination of Ypresian , referring to the age of the specimens and the Greek myrmex , meaning " ant " . The minimum fossil age is approximately 54 @. @ 5 to 55 @. @ 5 million years .

Along with the genus description , the paper contained descriptions of the type species Ypresiomyrma orbiculata and Ypresiomyrma bartletti , both from the McAbee Fossil Beds in British Columbia , part of the Eocene Okanagan Highlands lake system . Archibald , Cover and Moreau also included a redescription of the Danish species Pachycondyla rebekkae under the new name combination Ypresiomyrma rebekkae . A fourth species , Ypresiomyrma orientalis was described in 2015 .

Archibald and colleagues originally classified Ypresiomyrma as incertae sedis (Latin for " of uncertain placement ") within the ant subfamily Myrmeciinae , as the ants could not be identified to any tribe level . However , a 2008 paper by Cesare Baroni Urbani of the University of Basel , Switzerland , expressed doubt that members of Ypresiomyrma were even ants . He notes that the development of the malar area (an area between the compound eyes and the mandibles) was different and not reduced , as a reduced malar is synapomorphic (key diagnostic traits) in Myrmeciinae . Baroni Urbani further notes that the antennae's shape on the type species could not be properly determined , making its true placement within Formicidae indeterminable . However , the antennae of Y. rebekkae has an elongated scape which means the fossil is definitely an ant , as this feature is a key diagnostic trait for Formicidae . Due to this , Baroni Urbani believed that Ypresiomyrma could only be confidently classified as incertae sedis within the family Formicidae . A subsequent report by Russian palaeoentomologist Gennady M. Dlussky describing new myrmecines accepted the classification of Archibald and colleagues without mentioning the comments of Baroni Urbani .

The following cladogram generated by Archibald and colleagues show the possible phylogenetic position of Ypresiomyrma among some ants of the subfamily Myrmeciinae . The genus may be closely related to other extinct Myrmeciinae genera , including Avitomyrmex and Macabeemyrma , and the extant Nothomyrmecia macrops .

= = Description = =

There are several characteristics that separate Ypresiomyrma from other ant genera . The waist connecting the thorax and the abdomen in Ypresiomyrma is composed of a single segment . The head in each species varies in shape , and mandibles are a distinct triangular shape and shorter than the head capsule with eight to twelve teeth , although they are elongated . Queens of the genus are large , measuring over 20 millimetres (0 @. @ 79 in) . Other characters include large ,

well developed eyes , a rounded propodeal dorsum and a noticeable stinger .

== Y. orbiculata ==

Y. orbiculata was described from a single part and counterpart compression fossil found at the Middle Ypresian McAbee Fossil Beds , Kamloops Group , near Cache Creek , British Columbia . The type specimens numbered UCCIPR L @-@ 18 F @-@ 749 and UCCIPR L @-@ 18 F @-@ 750 for the part and counterpart is currently preserved in the palaeoentomology collections housed at Thompson Rivers University , in Kamloops , British Columbia . Archibald , Cover , and Moreau coined the specific epithet from the Latin " orbiculatus " , meaning " rounded " or " circular " , in reference to the shape of the head . The species is discernible from the other two species of *Ypresiomyrma* by its notably rounded head capsule , and by the shape of the petiole which has a smoothly sloping convex shape with a node in the center . The petiole is similar in appearance to *Prionomyrmex janzeni* , and the propodeum is round . The queen is estimated to have been approximately 25 millimetres (0 @. @ 98 in) . The compound eyes are large and oval shape , but the antennae cannot be described due to poor preservation . The mandibles are large , containing seven to eight teeth . A well @-@ developed stinger is also present .

== Y. bartletti ==

The second species described from the McAbee Fossil Beds is *Y. bartletti* which , like *Y. orbiculata* , is known from a single queen specimen . The holotype part and counterpart are included in the Geological Survey of Canada , Ottawa collections as GSC 127632a and GSC 127632b . The shape of the head is subtriangular , which separates it from *Y. orbiculata* , and at an estimated 20 millimetres (0 @. @ 79 in) it is smaller than *Y. rebekkae* . The petiole shape in *Y. bartletti* is distinct from both other species . The specific epithet was chosen in honor of Rod Bartlett who collected the specimen , and to honor his work with the Vancouver Paleontological Society and the British Columbia Paleontological Alliance . The antennae are not preserved and the eyes cannot be distinguished . The mandibles have around ten or fewer teeth . The forewings of the queen are faintly preserved , and portions of the legs are preserved and disarticulated . Some portions of the gaster are deformed and the specimen appears to be crushed , but the overall morphology of this species justifies its placement within *Myrmeciinae* . An undescribed worker in the form genus *Myrmeciites* may possibly be a *Y. bartletti* ant , but this cannot be confirmed due to its poor preservation .

== Y. rebekkae ==

This species is known from over 100 specimens collected from the earliest Ypresian Ølst and Fur Formations , found in calcareous rocks . The specimens were first studied and described by Jes Rust and N. Møller Andersen in 1999 , and they named the species for Rebekka Madsen who collected the type specimen in September 1994 . The holotype and paratype queen described are well preserved , although the legs are missing ; the part and counterpart , GMUC No. 1995 8B and GMUC No. 1995 8A are deposited in the Geological Museum of the University of Copenhagen . At that time , Rust and Andersen placed the species into the modern ponerin genus *Pachycondyla* based on the shape of the abdominal segment VI and lack of dentition on the mandibles . Archibald , Cover , and Moreau moved the species to *Ypresiomyrma* based on the similarity to the McAbee species , by the shape of the abdominal segment III , which differs from that found in the *Ponerinae* subfamily genera , and by the morphology of the petiole . *Y. rebekkae* can be distinguished from other species by the shape of its petiole and the size of its head , being notably larger than *Y. bartletti* . The ants ' somewhat angular head is also different , with other species having a rounded head . The species is known almost exclusively from queens , with only one known male ant assigned to it by Rust and Andersen .

The average length of a queen is around 25 millimetres (0 @. @ 98 in) , with a robust body . The

head is round , and the width and length are the same , measuring 4 @. @ 5 millimetres (0 @. @ 18 in) . The eyes are oval shaped and developed , located near the middle of the head . The mandibles are triangular and long , with ten teeth present . The antennae are long with 11 segments , and the scape is 3 @. @ 4 millimetres (0 @. @ 13 in) long . The mesosoma is 7 millimetres (0 @. @ 28 in) long and 4 @. @ 5 millimetres (0 @. @ 18 in) wide . The mesosoma is convex and domed , and the pronotum is short . The petiole is 1 @. @ 5 millimetres (0 @. @ 059 in) long and 2 @. @ 3 millimetres (0 @. @ 091 in) in wide , and the gaster is swollen , but this is due to the early taphonomic process (the transition of a decaying organism over time and how it becomes fossilised) . A well @-@ developed stinger is present in the fossilized specimens .

Only a single complete male is known from all the collected specimens . The body length is shorter in comparison to the queen caste , measuring 25 millimetres (0 @. @ 98 in) and it is also more slender . The head and mandibles are small , but the eyes are fully developed and large . The antennae are not preserved , and only small fragments of the legs are present . The gaster is smaller and more elongated , but the genitalia are not preserved .

= = = *Y. orientalis* = = =

Y. orientalis was described from a part and counterpart holotype and a solitary forewing paratype compression fossil found at the late Eocene Bol ? shaya Svetlovodnaya fossil site , in the Sikhote @-@ Alin area of far @-@ eastern Russia . The type specimens numbered PIN 3429 / 1109 for the part and counterpart and PIN 3429 / 1198 are currently preserved in the A.A. Borissiak Paleontological Institute fossil collections of the Russian Academy of Sciences . Dlussky , Rasnitsyn , and Perfilieva coined the specific epithet from the Latin " *orientalis* " , meaning " eastern " , in reference to the type locality . The species is discernible from *Y. rebekkae* by its smaller petiole node size . While there are no distinct differences between *Y. orientalis* and the two Okanagan Highlands species *Y. bartletti* and *Y. orbiculata* , the fossils were placed into a new species by Dlussky , Rasnitsyn , and Perfilieva . This is due to the notable time difference between the highlands and Bol ? shaya Svetlovodnaya . Though the possible gyne is incomplete the estimated body length is 17 @. @ 5 mm (0 @. @ 69 in) and the mesosoma is robust . The fore @-@ wing has closed 1 + 2r , 3r , rm and mcu cells , with the 3r elongated while the 1 + 2r is shorted to just over twice as long as wide .

= = Ecology = =

The life habits of *Ypresiomyrma* would have been similar to that of extant Myrmeciinae ants . Colonies nested in the soil or in trees , making them an arboreal nesting species . Workers were most likely solitary foragers , foraging on the ground or onto low vegetation and trees while preying on arthropods or consuming nectar . Workers most likely did not recruit or lead nestmates to food sources , nor did workers lay down pheromone trails . *Ypresiomyrma* ants most likely used their large eyes to find prey and for navigational purposes .

The abundance of *Ypresiomyrma* queens collected suggests that these ants mated in swarms , but the alates were poor flyers due to their large size . The morphology of the mandibles indicate they were specialised tools for excavating chambers in soil or wood during colony foundation ; their large size and common occurrence in their geographical range would mean they were an important food source to a variety of birds and Paleogene animals that predominately fed on insects .