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[urn:lsid:zoobank.org/pub:21D25169-D078-456E-9FF2-6A5FA3C40597](https://zoobank.org/pub:21D25169-D078-456E-9FF2-6A5FA3C40597)

Two new species of *Archeohomalopia* Nikolajev, 1982 from China (Coleoptera: Scarabaeidae: Sericini)

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[urn:lsid:zoobank.org/author:DEDCE5CF-AA11-4BBF-A2C6-D7C815019714](https://zoobank.org/author:DEDCE5CF-AA11-4BBF-A2C6-D7C815019714)

Abstract. Two new species, *Archeohomalopia xiajuan* sp. nov. and *Archeohomalopia volkovitchi* sp. nov., are described and illustrated from Yunnan (China). The key to the species of *Archeohomalopia* Nikolajev, 1982 is updated and additional new records of the genus are given.

Keywords. Coleoptera; beetles; scarab chafers; Yunnan; China; new species.

INTRODUCTION

This paper is a further update on a comprehensive taxonomic revision of the Sericini of China and adjacent regions. All genera of Sericini occurring in China have been revised at least once, for several groups further updates have been given as well (Ahrens 1996, 2000a, 2000b, 2000c, 2001, 2003a, 2003b, 2003c, 2003d, 2005a, 2005b, 2006a, 2006b, 2006c, 2007a, 2007b, 2007c, 2009, 2011, 2021a, 2021b, 2021c; Ahrens et al. 2014a, 2014b, 2014c, 2021a, 2021b, 2022, in press; Liu et al. 2011, 2014a, 2014b, 2014c, 2014d, 2014e, 2015a, 2016, 2017a, 2017b, 2019; Ahrens & Pacholátko 2003, 2007; Ahrens & Fabrizi 2009a, 2009b, 2011; Bohacz & Ahrens 2020; Fabrizi et al. 2021).

The genus *Archeohomalopia* Nikolajev, 1982 was originally erected by Nikolajev (1982) mainly based on its differences to the genus *Omalopia* Schoenherr, 1817, such as the antenna being composed by ten antennomeres (instead of nine) (see Ahrens 2011). Originally, it included only two species (*A. potanini* Nikolajev, 1982 and *A. medvedevi* Nikolajev, 1982), while subsequently a third species of a recently erected genus *Melanomaladera* Miyake & Yamaya, 2001, *M. yunnana* Miyake & Yamaya, 2001, was assigned as well to *Archeohomalopia* (Ahrens 2007). Ahrens (2007) also synonymized *A. potanini* Nikolajev, 1982 with the senior synonym, *Homalopia abbreviata* Fairmaire, 1897, and he added later other ten species to the genus (Ahrens 2011). All species are so far known to be endemic to the area between Yunnan and northern Indochina (Myanmar/Thailand). Here, I describe further two new species of the genus *Archeohom-*

alopia Nikolajev, 1982, which were discovered among specimens of the ZIN that Andrey Frolov kindly made available for study a couple of years ago.

MATERIAL AND METHODS

The terminology and methods used for measurements, specimen dissection and genital preparation follow Ahrens (2004). Data from specimens examined are cited in the text with original label contents given in quotation marks, multiple labels for a single specimen are separated by a “/”. Descriptions and illustrations of new taxa are based on the holotype specimen if not otherwise stated, while the variation of specimens is given separately under “variation”. Male genitalia were glued to a small pointed card and photographed in both lateral and dorsal views using a stereomicroscope Leica M125 with a Leica DC420C digital camera. A number of single focussed images were combined with the Automontage software in order to obtain an entirely focussed image. The resulting images were subsequently digitally edited.

Institutional abbreviations

ZFMK = Zoologisches Forschungsmuseum A. Koenig,
LIB Bonn (Germany);

ZIN = Zoological Institute, Russian Academy
of Sciences, St. Petersburg (Russia).

RESULTS

Archeohomaloptia xiajuan sp. nov.

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Fig. 1

Type material examined. Holotype: ♂ “Yunnan 70km NNW Xiajuan 24.V.2002 Volkovitch/ Asia Sericini sp 1158” (ZIN).

Description. Length: 4.9 mm, length of elytra: 3.1 mm, width: 2.5 mm. Body oblong, black, antenna black, dorsal surface shiny, with sparse and evenly spaced long, erect setae.

Labroclypeus trapezoidal, widest at base and strongly convergent apically, lateral margins weakly convex; anterior angles almost blunt, only weakly rounded; lateral border and ocular canthus producing an indistinct blunt angle; margins moderately reflexed, anterior margin moderately emarginate medially; surface medially convex and shiny, finely and densely punctate, distance between punctures less than their diameter, with a few robust punctures behind anterior margin bearing each a long, erect seta; frontoclypeal suture feebly incised, distinctly elevated and moderately curved; smooth area in front of eye approximately $1.2\times$ as wide as long; ocular canthus short and wide, subtriangular, rounded at apex, finely and densely punctate, with one terminal seta. Frons shiny, with fine, dense punctures; with numerous erect setae behind the frontoclypeal suture and beside eyes. Eyes very small, ratio of diameter/interocular width: 0.39. Antenna brown, with ten antennomeres; club dark brown, with three antennomeres, little shorter than remaining antennomeres combined. Mentum weakly elevated and flattened anteriorly.

Pronotum moderately wide, widest at middle, lateral margins strongly curved and slightly convergent basally, but stronger convergent anteriorly; anterior angles strongly produced and sharp, posterior angles strongly rounded and almost obsolete; anterior margin convexly produced medially, with a broad marginal line; basal margin with fine and complete marginal line; surface with dense and fine punctures, with a few long yellow, semierect setae on disc; anterior and lateral borders densely setose; hypomeron simple, not carinate at base and consequently not ventrally produced. Scutellum triangular and dull, slightly longer than wide, with fine and dense punctures, with minute setae in punctures.

Elytra oblong, widest in apical third, striae weakly impressed, finely and densely punctate, intervals weakly convex, with fine, moderately dense punctures often concentrated along the striae, odd intervals with single, fine, long, yellow setae (setae longer than interval width); interior apical angle of elytra with a short seta; epipleural edge fine ending at the strongly curved external apical angle of elytra, epipleura densely setose; apical border

of elytra with a narrow membranous rim of short microtrichomes.

Ventral surface shiny, with fine and moderately dense punctures, finely densely setose; metacoxa glabrous with a few fine, long, adjacent setae laterally only; abdominal sternites micro-reticulate, with an indistinct, transverse row of coarse punctures bearing a moderately long seta between fine, dense punctation, a few fine punctures bear a short seta; penultimate sternite apically with a smooth, sclerotized border which is one fifth as long as the sternite, last sternite medially $0.75\times$ as long as penultimate one. Mesosternum between mesocoxae as wide as mesofemur, with fine, long setae. Ratio of length of metepisternum/metacoxa: 1/1.48. Pygidium strongly convex at apex, finely and densely punctate, without smooth midline; surface shiny, sparsely covered with short and longer setae.

Legs slender and moderately long; femora shiny, with two longitudinal rows of setae, coarsely but sparsely punctate; metafemur sharply carinate anteriorly and without a submarginal serrate line, posterior margin weakly convex and with a few short setae basally, its ventral part only weakly widened in apical half and not serrate, dorsal posterior margin not serrate, with dense, long setae. Metatibia slender and moderately long, evenly widened towards apex, ratio width/length: 1/3.2; dorsally longitudinally convex, apically also weakly carinate, with two groups of spines, basal group at first quarter, apical group at two thirds of metatibial length, basally with a few single, fine setae; external face longitudinally convex, with fine punctures laterally, glabrous; ventrally with a sharp, finely serrate margin, with four robust setae; internal face laterally with a few punctures bearing each a fine seta; apex interiorly deeply excavate at middle and not truncate near tarsal articulation. Meso- and metatarsomeres dorsally glabrous and finely densely punctate, ventrally with sparse, short setae; metatarsomeres ventrally with a finely serrate ridge, beside it with a robust longitudinal carina; metatarsomere 1 as long as following tarsomere and slightly longer than dorsal tibial spur. Protibia moderately long, bidentate, protarsal claws symmetric.

Aedeagus: Fig. 1A–D. Habitus: 1E. Female unknown.

Diagnosis. *Archeohomaloptia xiajuan* sp. nov. is in external appearance rather similar to *A. hebashana* Ahrens, 2011. The new species differs by the shape of the dorsal apophysis of the phallobase which is apically more strongly widened and truncate at apex; the parameres are narrower and weakly curved.

Etymology. The species is named according to its occurrence near Xiajuan (noun in apposition).

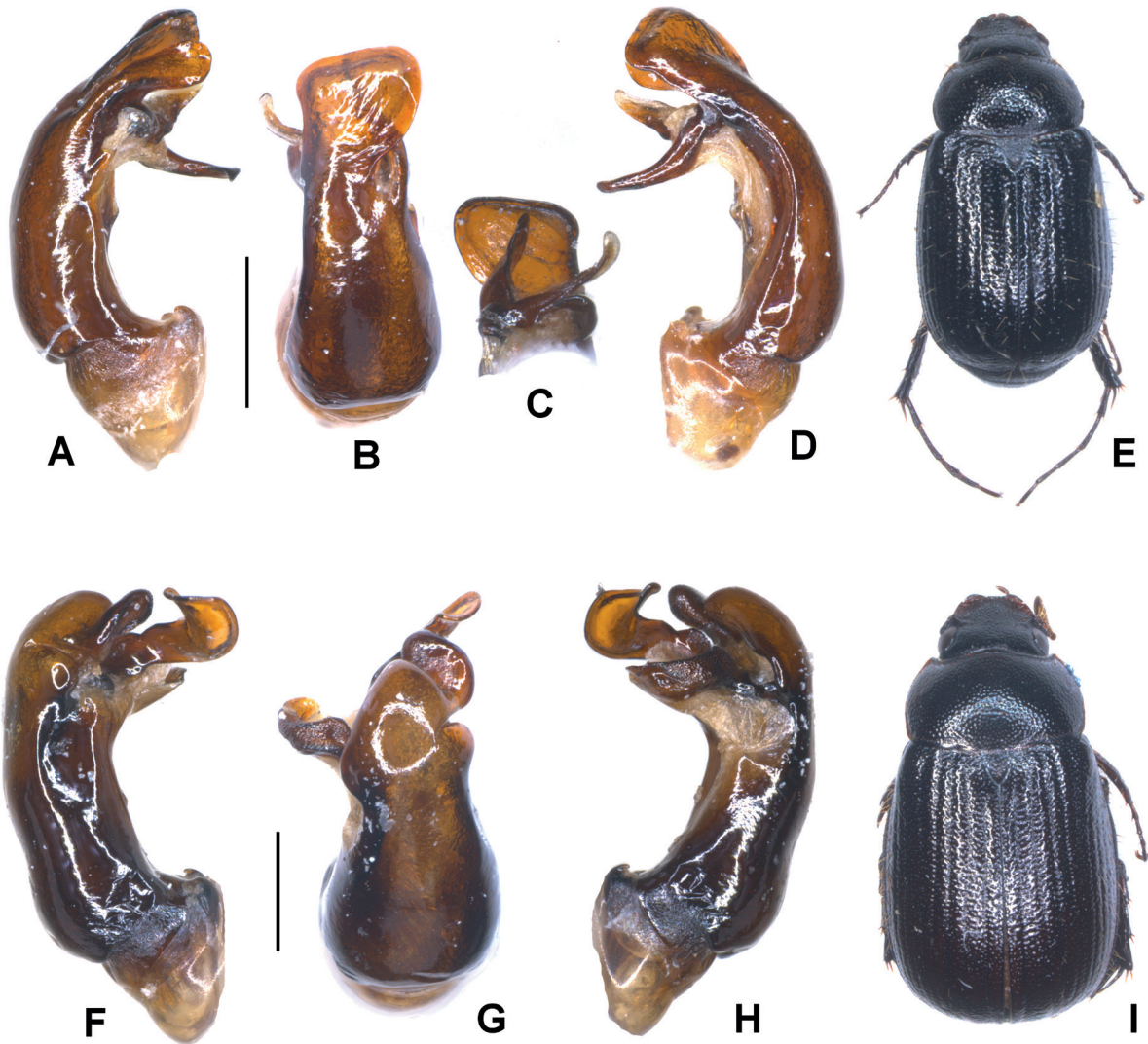


Fig 1. A–E. *Archeohomaloptia xiajuan* sp. nov. (holotype). F–I. *Archeohomaloptia volkovitchi* sp. nov., holotype. A, F. Aedeagus, left side lateral view. D, H. Aedeagus, right side lateral view. B, G. Aedeagus, dorsal view. C. Parameres, ventral view. E, I. Habitus (not to scale). Scale: 0.5 mm.

Archeohomaloptia volkovitchi sp. nov.

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Fig. 1

Type material examined. Holotype: ♂ “Yunnan 70km NNW Xiajuan 24.V.2002 Volkovitch/ Asia Sericini sp 1159” (ZIN). Paratypes: 1 ♂, 1 ♀ “Yunnan 70km NNW Xiajuan 20.V.2002 Volkovitch” (ZIN, ZFMK).

Description. Length: 5.9 mm, length of elytra: 4.0 mm, width: 3.1 mm. Body oblong, black, antenna black, dorsal surface shiny, with a few sparse short setae on elytra, otherwise glabrous.

Labroclypeus trapezoidal, widest at base and strongly convergent apically, lateral margins convex; anterior

angles almost blunt, weakly rounded; lateral border and ocular canthus producing a blunt angle; margins moderately reflexed, anterior margin moderately emarginate medially; surface medially convex and moderately shiny, finely and densely punctate, distance between punctures less than their diameter, with a few robust punctures behind anterior margin bearing each a long, erect seta; frontoclypeal suture weakly incised and moderately curved; smooth area in front of eye approximately $1.3 \times$ as wide as long; ocular canthus short and wide, subtriangular, rounded at apex, finely and densely punctate, without terminal seta. Frons shiny, with fine, dense punctures; with a single seta at the end of frontoclypeal suture beside eyes. Eyes small, ratio of diameter/interocular width: 0.51. An-

tenna brown, with ten antennomeres; club yellow, with three antennomeres, little longer than remaining antennomeres combined. Mentum weakly elevated and flattened anteriorly.

Pronotum moderately wide, widest at middle, lateral margins strongly curved and slightly convergent basally, but stronger convergent anteriorly; anterior angles strongly produced and sharp, posterior angles strongly rounded and almost obsolete; anterior margin convexly produced medially, with a broad marginal line; lateral basal margin with marginal line, otherwise without margin; surface with dense and fine punctures, glabrous and only with minute setae in punctures; anterior and lateral borders densely setose; hypomeron simple, not carinate at base and consequently not ventrally produced. Scutellum triangular and shiny, slightly longer than wide, with fine and dense punctures, with minute setae in punctures.

Elytra oblong, widest in apical third, striae weakly impressed, finely and densely punctate, intervals weakly convex, with fine, moderately dense punctures often concentrated along the striae, odd intervals with single, fine, short, yellow setae; interior apical angle of elytra with a short seta; epipleural edge fine ending at the strongly curved external apical angle of elytra, epipleura densely setose; apical border of elytra with a narrow membranous rim of short microtrichomes.

Ventral surface shiny, with fine and moderately dense punctures, finely densely setose; metacoxa glabrous with a few fine, long, adjacent setae laterally only; abdominal sternites micro-reticulate, with an indistinct, transverse row of coarse punctures bearing a moderately long seta between fine, dense punctation, a few fine punctures bear a short seta; penultimate sternite apically with a smooth, sclerotized border which is one fifth as long as the sternite, last sternite medially $0.75 \times$ as long as penultimate one. Mesosternum between mesocoxae as wide as mesofemur, with fine, long setae. Ratio of length of metepisternum/metacoxa: 1/1.44. Pygidium moderately evenly convex, finely and sparsely punctate, without smooth midline; surface shiny, only at apex with short setae.

Legs slender and moderately long; femora shiny, with two longitudinal rows of setae, coarsely but sparsely punctate; metafemur sharply carinate anteriorly and without a submarginal serrate line, posterior margin weakly convex and with a few short setae basally, its ventral part only weakly widened in apical half and not serrate, dorsal posterior margin not serrate, with dense, long setae. Metatibia slender and moderately long, evenly widened towards apex, ratio width/length: 1/3.2; dorsal margin sharply carinate, with two groups of spines, basal group at first quarter, apical group at two thirds of metatibial length, basally with a few single, fine setae; external face longitudinally convex, with coarse and dense punctures laterally, glabrous; ventral margin with a sharp, finely serrate margin, with four robust setae; internal face laterally with a few punctures bearing each a fine seta;

apex interiorly deeply excavate at middle and not truncate near tarsal articulation. Meso- and metatarsomeres dorsally glabrous and finely densely punctate, ventrally with sparse, short setae; metatarsomeres ventrally with a finely serrate ridge, beside it with a robust longitudinal carina; metatarsomere 1 as long as following tarsomere and slightly longer than dorsal tibial spur. Protibia moderately long, bidentate, protarsal claws symmetric.

Aedeagus: Fig. 1F–H. Habitus: 11.

Diagnosis. *Archeohomaloptia volkovitchi* sp. nov. differs from all other *Archeohomaloptia* species by the complexly shaped dorsal apophysis of the phallobase which is bent several times around its axis.

Etymology. The species is named in honor of its collector V. Volkovitch (noun genitive case singular).

Variation. Length: 5.9–6.1 mm, length of elytra: 4.0–4.4 mm, width: 3.1–3.3 mm. Female: Antennal club distinctly shorter than the remaining antennomeres combined, eyes little smaller than in male: ratio of diameter/interocular width: 0.42; pygidium almost flat, impunctate in apical half, with a fine microstructure.

Archeohomaloptia frolovi Ahrens, 2011

Additional material examined. 2 ♂♂ “Dol. r. Tunk-goho 22-VII-93 Potanin/ Paratypus Arch. medvedevi Nikolajev 1982” (ZIN).

Updated key to the species of *Archeohomaloptia* (♂♂)

- 1 Hypomeron not carinate. Metatarsomere 1 shorter than the following tarsomere. Elytra and legs black 2
- 1' Hypomeron finely carinate. Metatarsomere 1 longer than the following tarsomere. Elytra dark brown, legs brownish 14
- 2 Disc of pronotum with numerous long, erect setae 3
- 2' Disc of pronotum without long setae. 7
- 3 Setae on pronotum and elytra long, twice as long as ocular diameter *A. frolovi* Ahrens, 2011
- 3' Setae on pronotum and elytra moderately long, as long as ocular diameter 4
- 4 Dorsal apophysis of aedeagus narrow 5
- 4' Dorsal apophysis of aedeagus wide and truncate at apex *A. xiajuan* sp. nov.
- 5 Dorsal apophysis of aedeagus moderately long and straight (dorsal view). Setae on elytra shorter than intervals wide. Posterior angles of pronotum blunt. 6
- 5' Dorsal apophysis of aedeagus strongly bent backwards at middle forming a sharp hook. Setae on elytra almost as long as intervals wide. Posterior angles of pronotum obsolete *A. hebashana* Ahrens, 2011

- 6 Right paramere strongly bent twice, behind basal third and shortly before apex
..... *A. yunnana* (Miyake & Yamaya, 2001)
- 6' Right paramere strongly bent once only, behind basal third *A. ganhaiziensis* Ahrens, 2011
- 7 Basal marginal line almost complete medially 8
- 7' Basal marginal line widely interrupted medially... 12
- 8 Sides of clypeus strongly convex, basally slightly convergent, showing a distinct angle with the ocular canthus. Body size larger than 7 mm. Aedeagus with large lateral apophysis
..... *A. abbreviata* (Fairmaire, 1897)
- 8' Clypeus widest at base, angle between sides of clypeus and ocular canthus blunt and indistinct. Body size smaller than 6 mm 9
- 9 Tegument of pronotum smooth and very shiny. ... 10
- 9' Tegument of pronotum micro-reticulate (80x) and slightly dull *A. kalabi* Ahrens, 2011
- 10 Dorsal apophysis of phallobase short, much shorter than the apex of phallobase wide
..... *A. nikolajevi* Ahrens, 2011
- 10' Dorsal apophysis of phallobase long, almost as wide as the apex of phallobase 11
- 11 Posterior angles of pronotum and anterior angles of labroclypeus blunt *A. medvedevi* Nikolajev, 1982
- 11' Posterior angles of pronotum obsolete. Anterior angles of labroclypeus convex
..... *A. yaregongensis* Ahrens, 2011
- 12 Setae on elytra distinctly shorter than elytral intervals wide. Dorsal apophysis of phallobase wide at base ..
..... 13
- 12' Setae on elytra as long as elytral intervals wide. Dorsal apophysis of phallobase all over narrow and tube-shaped *A. safraneki* Ahrens, 2011
- 13 Dorsal apophysis of phallobase simple, not reflexed around its axis, sharply narrowed and pointed at apex. Right paramere divided in a dorsal and ventral lobe *A. mingi* Ahrens, 2011
- 13' Dorsal apophysis of phallobase reflexed around its axis, not sharply narrowed and pointed at apex. Right paramere simple, not divided in a dorsal and ventral lobe *A. volkovitchi* sp. nov.
- 14 Antennal club slightly reflexed, almost twice as long as the remaining antennomeres combined. Tibiae and tarsi yellowish brown
..... *A. taungyiensis* Ahrens, 2011
- 14' Antennal club straight, almost 1.5× as long as the remaining antennomeres combined. Tibiae and tarsi brown *A. acuta* Ahrens, 2011

DISCUSSION

The two newly discovered species raise the species count of known *Archeohomaloptia* taxa to 15. In the only so far existing comprehensive molecular phylogeny (Eberle

et al. 2017), which also includes *Archeohomaloptia*, the genus resulted to be an ancestral lineage of a major clade of lineages composed mainly of species from the Indomalayan archipelago (e.g., including *Trioserica* Moser, 1922, *Neoserica* Brenske, 1894 sensu lato, *Tetraserica* Ahrens 2004, and *Microserica* Brenske, 1894). Most other species of the Asian mainland are part of a second clade, which is sister to the first one. Some lineages of this clade also colonized Africa and Northern America. All this makes the genus *Archeohomaloptia* particularly interesting from biogeographical point of view, especially also its relics-like occurrence in Yunnan and northern Indochina.

While the number of species of the genus *Archeohomaloptia* slightly increased with this contribution, this, however, changes very little in the asymmetric relation of species number compared to its sister clade in this first mentioned clade. Here, *Archeohomaloptia* is contrasted by several hundreds of species. The current study may contribute only little to resolve the questions about the causalities of these patterns of asymmetric diversity; however, small-scale biogeographical problems have been addressed only to a very limited extent (Liu et al. 2015b), mainly based on phylogenies with morphological characters (Ahrens 2006a, c, 2007c, 2009) which might be strongly under the impact of homoplasy of many morphological features. Given that existing molecular phylogenies are in large based on mitochondrial DNA, it appears premature to drive at this stage any conclusions, since many nodes of the phylogeny by Eberle et al. (2017) are yet poorly supported or even unresolved. Also, better sampling within the genus for molecular data would be desirable to test properly the monophyly of *Archeohomaloptia* – all tasks for future phylogenetic analyses of the group and the tribe.

Acknowledgements. I thank Benedict Wipfler (ZFMK) for his help in dissecting genitalia of male specimens. I am grateful to A. Frolov (ZIN) for the loan of specimens. And last not least, I thank the editor and the two anonymous reviewers for their helpful comments on the manuscript.

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