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A new genus *Sinoaplastinus*, with a new species *S. kadeji* from China,  
the first elaterid-beetle with bi-lamellate antennomeres from the  
Palaeartic Region  
(Insecta: Coleoptera: Elateridae)

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ABSTRACT. In this paper we introduce a new genus, *Sinoaplastinus*, with a new species, *S. kadeji*, from the Chinese province Sichuan. This new species is the first Elaterid-beetle with bi-lamellate antennomeres known from the Palaeartic Region.

Key words: entomology, taxonomy, Coleoptera, Elateridae, *Sinoaplastinus* new genus, *S. kadeji* new species, China.

#### INTRODUCTION

The tribe Aplastini comprises species of genera which are distributed all over the world: *Aplastus* LE CONTE, 1853, *Diplophoenicus* CANDÈZE, 1895, *Didymolophus* FAIRMAIRE, 1904, *Plastocerus* LE CONTE, 1853, *Pyrapractus* FAIRMAIRE, 1884, *Practapyrus* FLEUTIAUX, 1929, *Euthysanius* LE CONTE, 1853, and *Dodecacius* SCHWARZ, 1902, and males of some of the species of these genera possess lamellate antennae. Only one species of the tribe Aplastini is described from the Palaeartic Region until today: *Plastocerus angulosus* GERMAR, 1845. *P. schaumi* LE CONTE, 1853, a Nearctic species which has been described from California, is actually placed as a member of the genus *Octinodes* CANDÈZE, 1863. While the males of the species of *P. angulosus* carry mono-lamellate antennomeres, the male specimen we are going to describe as new to science possesses bi-lamellate antennomeres from third antennae segment

on. This characteristic is generally very rare in beetle-groups all over the world, and especially in the family of Elateridae. Until today it has only been known from two groups of Elateridae: male specimen of species of the genus *Anisomereus* SCHWARZ, 1897 from the Afro-tropical Zone; and those of the genus *Pityobius* LE CONTE, 1853 from North America possess bi-lamellate antennomeres. *Anisomereus* and *Pityobius* belong to the subfamily Elaterinae, and some authors treat *Anisomereus* as a member of the family Eudicronychidae, while the new species belong to the subfamily Aplastinae of Elateridae. The holotype of the new species is preserved in collection of the first author of this paper (CSV).

#### SYSTEMATIC

In this paper we are going to place the new genus in the tribe Aplastini STIBICK, 1979, as the holotype of the new species possesses the following systematic characteristics: mesothorax sub-quadrate, body depressed, flattened; mesocoxae open to mesepimeron; basis of falcula without setae; head deflexed, frons without ridge between and above the basis of antennae, and strongly declivous.

#### ***Sinoaplastinus* n. gen.**

(Figs. 2, 3)

#### TYPE SPECIES

*Sinoaplastinus kadeji* n. sp., gender: masculine.

#### DIAGNOSIS

♂: Body elongate, sub-parallel, depressed, flattened, moderately lustrous; length: 10.0 mm, width: 2.1 mm; bi-coloured, head declivous, frons without ridge between eyes; antennae eleven-segmented, bi-lamellate from third antennomere on; integument crinose, pubescence bristly, dense, and erect; pubescence of antennae conspicuously short.

#### DESCRIPTION

Head declivous, with conspicuously dense puncturation, punctures umbilicate, their interstices much smaller than their diameter, and reduced to small wrinkles, pubescence long and protruding to apex; head declivous from centre to apex, frons slightly raised above the base of antennae; eyes spherical, and prominent; antennae eleven-segmented and bi-lamellate from third antennomere on.

Pronotum depressed, campaniform, flattened, and with a relatively flat dropping at basis, laterally constricted at basal third; posterior angles of pronotum without carina; pronotum without any trace of furrow or mould; puncturation of pronotum dense, punctures umbilicate.

Scutellum almost rectangular and conspicuously raised; surface rugose and semi-shiny, puncture dense, punctures umbilicate.

Elytra sub-parallel, flattened, after apical third narrowed to apex; base of elytra as wide as that of pronotum and depressed at scutellum, shoulder with protuberance; striae of elytra linear, with deep punctures, interstices raised, and covered with very fine and dense, hardly discernible micro-reticulate structure.

Ala capable of flight, wings folded sub-apically with a lateral wing-joint.

Mesothorax sub-quadrangle, with moderately dense puncturation, points umbilicate; pubescence short and decumbent; mesocoxae open to mesepimeron.

Prosternal apophysis straight and inferomedial, arcuate apically.

Legs elongate, moderately long and robust, tarsomeres up to claws of decreasing length, base of falcularia without setae; ventrally with fine pubescence and fine upholstery.

Aedeagus with median lobe thin and sub-parallel, sub-apically slightly bevelled, the apices of the paramere slightly extending to the top of median lobe; apical lobe of paramere cochleariform, and without hairs.

#### DIFFERENTIAL DIAGNOSIS

The new genus *Sinoaplastinus* is closely allied to the genus *Plastocerus*, but may be easily distinguished from it by the bi-lamellate antennomeres, the depressed pronotum, not carinate hind angles of the base of the latter, and by the simple and cochleariform apices of parameres.

#### ETYMOLOGY

Named as a nomenclature combination of the locus typicus (China) and the name of the genus (*Aplastus*), from which the tribal name (Aplastini) is derived.

#### DISTRIBUTION

China: Sichuan.

### ***Sinoaplastinus kadeji* n. sp.**

(Figs. 2, 3)

#### LOCUS TYPICUS

China: Sichuan province.

#### TYPE MATERIAL

Holotypus ♂ (CSV): China: Sichuan, from Jintang to Tcho nin, 14.-19.VI.2007, leg. E. Kučera.

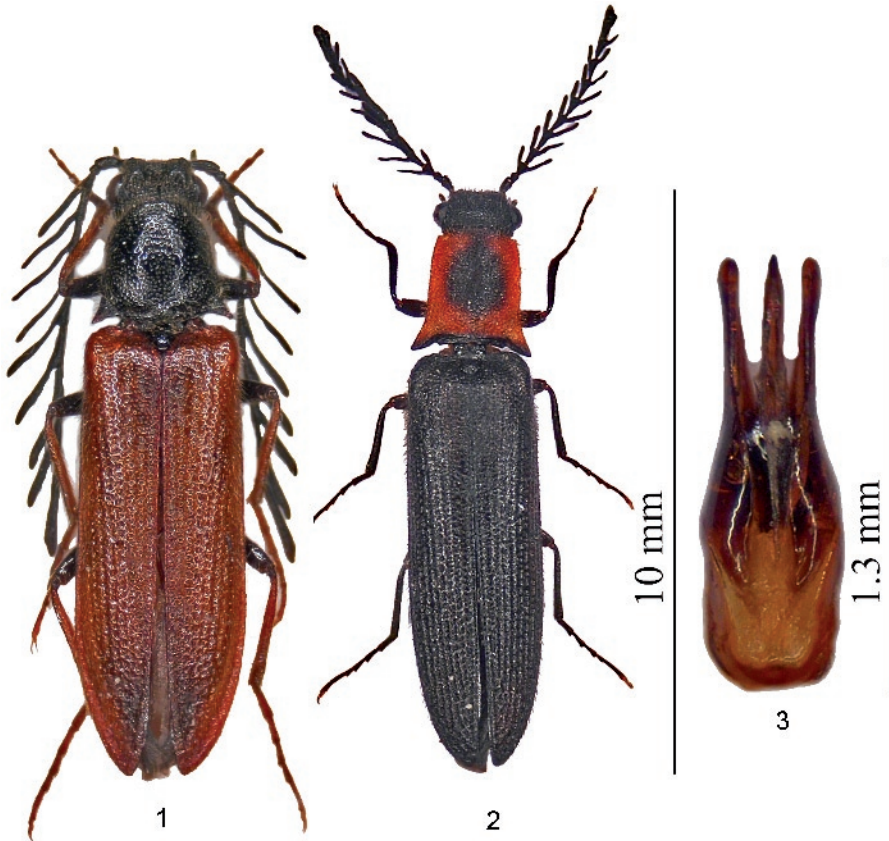
#### DIAGNOSIS

Holotypus ♂: Elongate, sub-parallel, flattened, and moderately lustrous species; length: 10.0 mm, width: 2.1 mm; black, pronotum orange-yellowish with a black macula on centre, claws yellow; integument crinose, pubescence on elytra and head brownish-black, on pronotum yellow, bristly, dense, and erect; pubescence of antennae conspicuously short; antennae eleven-segmented, and bi-lamellate from third antennomere.

## DESCRIPTION

Head declivous, with conspicuously dense puncturation, punctures umbilicate, their interstices of points much smaller than their diameter, and reduced to small wrinkles, pubescence long and protruding to apex; frons slightly raised above the base of antennae; eyes spherical, and prominent; antennae long, and bi-lamellate from third antennomere on, outreaching the posterior angles of pronotum for the length of the last two antennomeres; second antennomere sub-globular; third to tenth antennomere with two long lamellae, which exceed the length of the following antennomere, last antennomere cuneate, and extended apically.

Pronotum campaniform, along median line slightly shorter than wide across the apices of basal angles (length/width ratio 2.0:2.1), flattened, very slightly raised medially, and with a relatively flat dropping at basis, laterally constricted at basal third; posterior angles of pronotum slightly divergent, triangular, and without carina; pronotum without any trace of furrow or mould; puncturation of pronotum dense, points umbilicate,



1. Habitus of *Plastocerus angulosus* GERMAR, 1845; 2, 3. *Sinoaplastinus kadeji* n. sp., 2 – habitus, 3 – aedeagus

interstices smooth and shiny, much shorter than their diameter, and reduced to small wrinkles at the whole surface.

Scutellum almost rectangular, and conspicuously raised; surface rugose and shiny; puncturation dense, punctures umbilicate, interstices wrinkled; pubescence sparse, fine, and protruding.

Elytra sub-parallel, flattened, after apical third narrowed to apex; the latter arcuate, without an inner tooth; base of elytra as wide as that of pronotum and depressed at scutellum, margins very slightly raised, shoulder with protuberance (winged species); striae of elytra linear, with deep punctures, especially at apical fifth, interstices slightly raised basally and conspicuously raised apically; elytra covered with very fine and dense, hardly discernible micro-reticulate structure.

Ala blackish, capable of flight, wings folded sub-apically with a lateral wing-joint.

Pro-, meso- and meta-thorax with moderately dense puncturation, points umbilicate, interstices of points raised and little shiny; pubescence short and decumbent.

Prosternal apophysis straight and inferomedial, apically arcuate.

Legs elongate, moderately long and robust, tarsomeres up to claws of decreasing length, ventrally with fine pubescence and fine upholstery.

Aedeagus with median lobe thin and sub-parallel, sub-apically slightly bevelled, the apices of the parameres slightly extending to the top of median lobe; apical lobe of paramere cochleariform and without hairs.

Females are unknown.

#### DIFFERENTIAL DIAGNOSIS

The new species *Sinoaplastinus kadeji* has some common characteristics with *Plastocerus angulosus* (Fig. 1) but may be easily distinguished from this species by the bi-lamellate antennomeres, the orange-yellowish colour of pronotum, not carinate basal angles of the latter, and by the cochleariform paramere of aedeagus.

#### ETYMOLOGY

Named after Mr. M. KADEJ, University of Wrocław, honouring his excellent work on the family Dermestidae.

#### DISTRIBUTION

China: Sichuan.

#### DISCUSSION

Undoubtedly, the mentioned characteristics of the bi-lamellate antennomeres in males of various species-groups of Elateridae, which are geographically separated and distantly related (Elaterinae and Aplastinae), has to be taken as created by convergent evolution, and may be based on various factors; the phenotypic variance of the species is the basis for the ability to modify characteristics in accordance with the changes of the environment. Most likely, changes of external factors, both biotic and abiotic, like the climate, altitude, and the plant association in the habitat of a population, as

well as geophysical and geographical modifications, are those which cause adaptive modifications.

Although, in relation to the mentioned groups of Elateridae which carry bi-lamellate antennomeres, this characteristic undoubtedly has to be taken as a convergence. It also seems to be apomorphic, and as of the current knowledge it appears to be singular within the Aplastinae.

The characteristic of lamellate antennomeres in species of the family Elateridae mostly appears in males. The females of that species very often have simple or serrate antennae, and always shorter than the males. The reason for the evolution of lamellate antennae in males is, in most cases, based on the need to increase the surface of the antennae. This necessity is caused by the male strategy of finding sexual partners by scent orientation. Therefore, increasing the surface of antennae in males most likely enhances their ability to locate the females. Enlarged antennae surface enables the males to increase the number of sensory papilla, and as a result, the quality of orientation: the males smell the scent attractant of the females better. From this perspective, the evolution of bi-lamellate antennomere increases the effectiveness of the abovementioned male strategy.

As the male specimen of the new species has wings fully capable of flight, the partner-finding principle of this species is very probably based on a flying strategy, using the extraordinary structured and sensitively upgraded antennae for scent orientation.

The evolution of bi-lamellate antennomeres in males of elaterid beetles surely increases the sensitiveness of this orientation-organ, and the apomorphic appearance of this characteristic within a group of species which possess mono-lamellate antennae may be an indicator of an externally forced modification of the strategy of finding females by chemo-receptive transmission of the female pheromones, and the scent orientation of males.

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