



A review of the Asian species of the genus *Pachysternum* (Coleoptera: Hydrophilidae: Sphaeridiinae)

MARTIN FIKÁČEK^{1,2}, FENGLONG JIA^{3,6} & ALEXANDER PROKIN^{4,5}

¹Department of Entomology, National Museum, Kunratice 1, CZ-148 00 Praha 4, Czech Republic. E-mail: mfikacek@gmail.com

²Department of Zoology, Faculty of Science, Charles University in Prague, Viničná 7, CZ-128 44 Praha 2, Czech Republic

³Institute of Entomology, Life Science School, Sun Yat-sen University, West Xingang Road, Guangzhou, 510275, Guangdong, P. R. China. E-mail: fenglongjia@yahoo.com.cn

⁴Papanin Institute for Inland Water Biology, Russian Academy of Science, Borok, Russia. E-mail: prokina@mail.ru

⁵Voronezh State University, Research-Educational Center “Venevitinovo”, Universitetskaya sq. 1, Voronezh 394006, Russia.

E-mail: prokina@mail.ru

⁶Corresponding author

Table of contents

Abstract	2
Introduction	2
Material and methods	3
Generic morphology	4
<i>Pachysternum</i> Motschulsky, 1863	4
Asian <i>Pachysternum</i>	4
List of species	13
Diagnostic characters	13
Identification key	14
Species treatments	15
<i>Pachysternum apicatum</i> Motschulsky, 1863	15
<i>Pachysternum cardoni</i> Orchymont, 1926	20
<i>Pachysternum coomani</i> Orchymont, 1926	23
<i>Pachysternum curvatum</i> Orchymont, 1925	25
<i>Pachysternum haemorrhoum</i> Motschulsky, 1866	27
<i>Pachysternum kubani</i> sp. nov.	31
<i>Pachysternum nigrovittatum</i> Motschulsky, 1863	34
<i>Pachysternum rugosum</i> sp. nov.	38
<i>Pachysternum sandacanum</i> sp. nov.	40
<i>Pachysternum stevensi</i> Orchymont, 1926	42
<i>Pachysternum sulawesicum</i> Fikáček, 2006	46
Taxonomic changes outside <i>Pachysternum</i>	48
<i>Australocyon keralensis</i> (Hebauer, 2002), comb. nov.	48
<i>Megasternum japonicum</i> Shatrovskiy, 1989, stat. restit.	48
Discussion	49
Acknowledgements	51
References	51

Abstract

The Asian species of the genus *Pachysternum* Motschulsky, 1863 are revised and redescribed. Three new species are described: *Pachysternum kubani* **sp. nov.** (Laos, China: Sichuan), *P. rugosum* **sp. nov.** (China: Gansu, Shaanxi) and *P. sandakanum* **sp. nov.** (Malaysia: Sabah, Sarawak). Three new synonyms are established: *Megasternum gibbulum* Motschulsky, 1866 and *Pachysternum sibiricum* Kuwert, 1890 are junior synonyms of *Pachysternum haemorrhoum* Motschulsky, 1866; *Pachysternum nigratum* Jia, Wu & Pu, 1998 is a junior synonym of *P. stevensi* Orchymont, 1926. *Pachysternum keralense* Hebauer, 2002 is transferred to the *pilocnemoides* group of the genus *Australocyon* Hansen, 1990. *Megasternum japonicum* Shatrovskiy, 1989 is resurrected from the synonymy with *M. gibbulum* and considered as a valid name. Lectotypes are designated for the following species: *Pachysternum apicatum* Motschulsky, 1863, *P. curvatum* Orchymont, 1925, *P. haemorrhoum* Motschulsky, 1866, *P. nigrovittatum* Motschulsky, 1863, *P. sibiricum* Kuwert, 1890, *Megasternum gibbulum* Motschulsky, 1866 and *M. distinctum* Sharp, 1873. All *Pachysternum* species are diagnosed, relevant morphological characters are illustrated, and an updated identification key is provided. *Pachysternum apicatum* is interpreted as a polymorphic species exhibiting high geography-based variation and possibly consisting of some sibling taxa; diagnosing of these taxa requires more material and additional (ideally molecular) characters and is therefore left unresolved at the present time.

Key words: *Pachysternum*, *Australocyon*, *Megasternum*, Megasternini, taxonomy, new species, new synonym, new combinations, coprophagous beetles, Oriental Region, Palearctic Region, Sundaland

Introduction

The megasternine genus *Pachysternum* Motschulsky, 1863 currently contains 22 species distributed throughout the Afrotropical and Oriental Regions and in the eastern Palearctic (Hansen 1999, Short & Fikáček 2011). In addition, the African species *P. capense* Mulsant, 1844 recently expanded to southern and central Europe (Fikáček & Boukal 2004, Rocchi *et al.* 2006, Queney 2009) and also seems to be accidentally introduced (but possibly not established) to Australia (Hansen 1990; M. Fikáček, unpubl. data). Most Asian (and African) *Pachysternum* species are rather common inhabitants of mammal excrements and are therefore frequently represented in the collections.

The identity of the Asian representatives of the genus is rather clear, in contrast to the Afrotropical fauna which remains largely unknown and complicated by the problematic status of the genera *Cercillum* Knisch, 1921 and *Pigrillum* Knisch, 1921. Motschulsky (1863) described the genus on the basis of two species, *Pachysternum nigrovittatum* Motschulsky, 1863 and *P. apicatum* Motschulsky, 1863 which are both rather common and widely distributed throughout the Oriental region. Later, he included one additional species, the Japanese *Pachysternum haemorrhoum* Motschulsky, 1866, into the genus (Motschulsky 1866); the generic placement of this species was later questioned by Sharp (1879, 1884). An additional four species were described sixty years later by Orchymont (1925, 1926a, b), who also provided an identification key to all species known at that time. No additional taxa were subsequently described until studies by Jia *et al.* (1998), Hebauer (2002a) and Fikáček (2006) who described a new species from southern China, southern India, and Sulawesi respectively.

Between 2004 and 2006, the first author studied the rich material of the genus deposited in the Naturhistorisches Museum in Vienna, mainly to confirm the identity of European specimens of *P. capense* (see Fikáček & Boukal 2004). As a part of these studies, he found several seemingly undescribed species as well as many new faunistic records concerning the Oriental taxa. One of these was described by Fikáček (2006), who also defined the formal *P. nigrovittatum* species group containing all Asian species of the genus. Problematic specimens were either left undescribed (*P. rugosum* **sp. nov.** described herein) or erroneously identified as *P. nigratum* Jia, Wu et Pu, 1998 (the specimens actually are dark forms of *P. kubani* **sp. nov.** described herein) and the faunistic data concerning the Palearctic and Chinese species were published in a shortened form in the respective volume of the Catalogue of Palearctic Coleoptera (Hansen 2004) for which the Sphaeridiinae part was updated by M. Fikáček and S. Ryndevich. Since then, additional material was accumulated, and the study of all type specimens was made possible in the cooperation with the second and third authors of this paper. This allowed us to prepare a complete review of the taxonomy and distribution of the Asian species of *Pachysternum*. Results of this study are summarized in the presented paper.