



Zootaxa 3950 (1): 001–060
www.mapress.com/zootaxa/

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Monograph

ISSN 1175-5326 (print edition)

ZOOTAXA

ISSN 1175-5334 (online edition)

<http://dx.doi.org/10.11646/zootaxa.3950.1.1>

<http://zoobank.org/urn:lsid:zoobank.org:pub:7BD5A413-6E0D-4A5C-ACCE-9FDDC974BF>

ZOOTAXA

3950

Redefinition of *Acanthosoma* and taxonomic corrections to its included species (Hemiptera: Heteroptera: Acanthosomatidae)

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Magnolia Press
Auckland, New Zealand

Accepted by D. Rider: 18 Feb. 2015; published: 30 Apr. 2015

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(*Zootaxa* 3950)

60 pp.; 30 cm.

30 Apr. 2015

ISBN 978-1-77557-681-5 (paperback)

ISBN 978-1-77557-682-2 (Online edition)

FIRST PUBLISHED IN 2015 BY

Magnolia Press

P.O. Box 41-383

Auckland 1346

New Zealand

e-mail: zootaxa@mapress.com

<http://www.mapress.com/zootaxa/>

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ISSN 1175-5326 (Print edition)

ISSN 1175-5334 (Online edition)

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Abstract

The genus level diagnostic characters of *Acanthosoma* Curtis, 1824, *Anaxandra* Stål, 1876, and *Sastragala* Amyot & Serville, 1843 (Hemiptera: Heteroptera: Acanthosomatidae) are discussed. The synonymy of *Acanthosoma* and *Anaxandra* proposed by Kumar (1974) is supported. *Acanthosoma* and *Sastragala* are redefined and recognized as valid genera. The identities of various species of *Acanthosoma* are clarified based on their type materials, their diagnostic characters are discussed and several misidentifications in previous works are corrected. The following new or reinstated combinations and new subjective synonymies are proposed: *Acanthosoma haemorrhoidale haemorrhoidale* (Linnaeus, 1758) = *Acanthosoma proximum* Dallas, 1851, syn. nov. = *Acanthosoma difficile* Dallas, 1851, syn. nov. = *Acanthosoma dubium* Dallas, 1851, syn. nov.; *Acanthosoma firmatum* (Walker, 1868), comb. nov. (transferred from *Sastragala*) = *Acanthosoma giganteum* Matsumura, 1913, syn. nov.; *Acanthosoma murreeanum* (Distant, 1900), comb. nov. (transferred from *Sastragala*) = *Acanthosoma acutangulata* Liu, 1979, syn. nov. = *Sastragala neolongata* Ahmad & Moizuddin, 1990, syn. nov.; *Acanthosoma rufispinum* (Distant, 1887), comb. nov. (transferred from *Sastragala*) = *Sastragala minuta* Ahmad & Moizuddin, 1990, syn. nov.; *Acanthosoma tauriforme* (Distant, 1887) = *Anaxandra longispina* Liu, 1987, syn. nov.; *Acanthosoma hampsoni* (Distant, 1900), comb. nov. (transferred from *Sastragala*); *Acanthosoma labiduroides* Jakovlev, 1880 = *Acanthosoma coralliferum* Horváth, 1889, syn. nov. = *Acanthosoma zanthoxylum* Hsiao & Liu, 1977, syn. nov.; *Acanthosoma forfex* Dallas, 1851 = *Acanthosoma distinctum* Dallas, 1851, syn. nov.; *Acanthosoma rufescens* Dallas, 1851, comb. restit. = *Acanthosoma elongatum* Dallas, 1851, syn. nov. = *Anaxandra hamata* Reuter, 1881, syn. nov.; *Acanthosoma nigricorne* Walker, 1868 = *Acanthosoma nigrospina* Hsiao & Liu, 1977, syn. nov.; *Acanthosoma alaticorne* Walker, 1868, comb. restit. = *Anaxandra laticollis* Hsiao & Liu, 1977, syn. nov. New combinations resulting from synonymization of *Anaxandra* with *Acanthosoma*: *Acanthosoma sichuanense* (Liu, 1980), comb. nov., *A. montanum* (Liu, 1987), comb. nov. Species transferred to *Sastragala* Amyot & Serville, 1843: *Sastragala nigrolineata* (Stål, 1876), comb. nov.; *S. sigillata* (Stål, 1876), comb. nov.; *S. versicolor* Distant, 1910, comb. restit.; *S. yunnana* (Hsiao & Liu, 1977), comb. nov.; to *Elasmostethus* Fieber, 1860: *Elasmostethus singhalensis* (Distant, 1902), comb. nov. Lectotypes are designated for the following species: *Acanthosoma*: *A. difficile*, *A. distinctum*, *A. dubium*, *A. elongatum*, *A. forfex*, *A. proximum*; *Anaxandra*: *A. hamata*, *A. nigrocornuta* Reuter, 1881, *A. tauriformis*; *Sastragala*: *S. murreeana*, *S. rufispina*. A neotype is designated for *Anaxandra montana*. New country records: *Acanthosoma alaticorne* and *A. rufispinum*: Nepal; *A. forfex*: Burma (Myanmar); *A. labiduroides*: Burma (Myanmar) and Vietnam; *A. montanum*: Laos and Vietnam; *A. murreeanum*: India, Thailand; *A.*

nigricorne: Nepal, Burma (Myanmar) and Vietnam; *A. rufescens*: Pakistan, Nepal, Taiwan, Burma (Myanmar), Thailand, Laos and Vietnam.

Key words: Heteroptera, Acanthosomatidae, taxonomy, new combination, new synonymy, lectotype designation, South Asia, East Asia, Australia

Introduction

Acanthosomatidae (Hemiptera: Heteroptera: Pentatomoidea) comprises about 285 described species worldwide. The generic classification of the family was revised by Kumar (1974), who recognized 47 genera in 3 subfamilies. Subsequent authors (Rolston & Kumar 1975, Ahmad & Moizuddin 1990, Fischer 1996, Froeschner 1997, Faúndez 2014, Faúndez *et al.* 2014, Tsai & Rédei 2015) described new genera, synonymized other genera, removed genera from the family, or resurrected genera from synonymy; as a result the number of currently recognized genera is 56 (Kment 2006, Faúndez *et al.* 2014a, b, Tsai & Rédei 2015). Except of the fauna of the Asian part of Russia which was thoroughly elucidated by Kerzhner (1972), Kanyukova (1988) and Vinokurov & Kanyukova (1995), the East Palaearctic and Oriental fauna of Acanthosomatidae is badly in need of revision.

The present paper addresses species level synonymy problems in the genera *Acanthosoma* Curtis, 1824 and *Anaxandra* Stål, 1876. Both genera are distributed in East Asia, with one species of *Acanthosoma* having Transpalaearctic distribution, and one species reported from Australia (Cassis & Gross 2002). Kumar (1974) recognized *Anaxandra* as a junior subjective synonym of *Acanthosoma* but this decision was not followed by most subsequent authors (Hsiao & Liu 1977, Ahmad & Moizuddin 1985, 1990, Liu 1987, Liu & Wang 2004, Göllner-Scheiding 2006, Han & Liu 2010, Aukema *et al.* 2013). Prior to this study *Acanthosoma* contained about 28, *Anaxandra* about 17 species, and there was considerable disagreement among authors about the generic assignment of some of the included species.

During the present study we reexamined specimens of all but one (*A. taurina* Kirkaldy, 1910) of the species currently placed into *Acanthosoma* and *Anaxandra*, including types of most species which were of problematic identity. In this contribution we discuss the status and relationships of these two genera; redefine *Acanthosoma*; transfer several species into and remove other species from *Acanthosoma*; clarify the identities of several problematic species; designate lectotypes; and propose new combinations, new synonymies and various other taxonomic corrections.

Material and methods

External structures and genitalia were examined using stereoscopic microscopes (Olympus SZX12, Zeiss Discovery.V8). Drawings were made by using a camera lucida. Measurements were taken using a micrometer eyepiece. Male genitalia were dissected after careful heating in hypertonic KOH solution. Digital photographs were taken with a Nikon D90 camera equipped with an AF-S Micro Nikkor 60mm f/2.8G ED lens. Morphological terminology mostly follows Tsai *et al.* (2011).

Label data of type specimens are presented in verbatimly, lines are separated by backslash (\), the two sides of the label by double backslash (\\), texts in non-Latin scripts are transliterated or translated and provided between <>. Abbreviations: Ch = text in Chinese script; hw = handwritten, handwriting; pr = printed. Type depositories and localities verified by us are marked with exclamatory point (!); the symbol '>' placed between two depositories indicates specimen transfer by means of donation or exchange.

Abbreviations for depositories:

BMNH	Natural History Museum, London, United Kingdom;
HNHM	Hungarian Natural History Museum, Budapest, Hungary;
IZAS	Institute of Zoology, Chinese Academy of Sciences, Beijing, China;
LSUK	Linnaean Society, London, United Kingdom;
MNHN	Muséum National d'Histoire Naturelle, Paris, France;