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A lobed *Argiope* spider on its most eastern distribution – first record of *Argiope lobata* (Pallas, 1772) for the sub-family Argiopinae (Arachnida: Araneidae) in Mongolia¹

O. Lindecke & M. Wall

Abstract

The subfamily Argiopinae SIMON, 1890 is reported for Mongolia the first time by *Argiope lobata* (PALLAS, 1772). Furthermore, we herein highlight the most eastern distribution of this species, which is widespread in the Mediterranean, African and in some Asian countries. The obtained specimen was found in the Eastern Gobi, a landscape of semi-desert character. Despite numerous studies with arachnological background in the past, even larger species new for Mongolia could be found. Findings like this show the on-going need for basic biodiversity research in the Gobi ecoregions. We further discuss previous, but doubtful reports of *A. lobata* in South-east Asia and note the importance of distinct records at the border of *Argiope* species range.

Key words: arachnofauna, distribution, Araneidae, *Argiope lobata*, eastern Gobi

Introduction

Argiope lobata (PALLAS, 1772) is a large xero-thermophilic species belonging to the family of Araneidae. This family is divided into several subfamilies, including Argiopinae SIMON, 1890 to which this species belongs. It seems that all taxa comprised within Argiopinae are diurnal, bright coloured and tend to decorate their orb webs with a stabilimentum. All of them show a procurved posterior eye row when seen from above and a prosoma shining silver (LEVI 1983, NENTWIG et al. 2013, SCHARF & CODDINGTON 1997).

Argiope lobata shows a dark, camouflage like colour pattern ventrally of the ophistosoma. Dorsally a certain variability of colour schemes is present. The abdomen is strongly lobed. All legs are alternating yellowish and black coloured. Adult females are ca. four times larger than male conspecifics and reach between 16.8–25.5 mm. Like all orb weavers, *Argiope lobata* builds expansive orb-webs above ground level, which are easily recognised by the stabilimenta placed within the centre of the web extending up and down from the hub (BELLMANN 2001; BJØRN 1997; NENTWIG et al. 2013; personal observation).

As one of the most widespread species of the *Argiope* genus, its distribution range covers ca. 222° from the West to the East in the nemoral zone of the Palaearctic. Up until now there are no records showing that *Argiope lobata* occurs in the northern boreal zone (*sensu* MARUSIK & KOPONEN 2005 for an overview). The distribution extends from great parts of Africa, over the Mediterranean, through Central Asia to India (BJØRN 1997, JÄGER 2012, PLATNICK 2013, SILI-WAL & MOLUR 2007).

¹ Results of the Mongolian-German Biological Expeditions since 1962, No. 323.

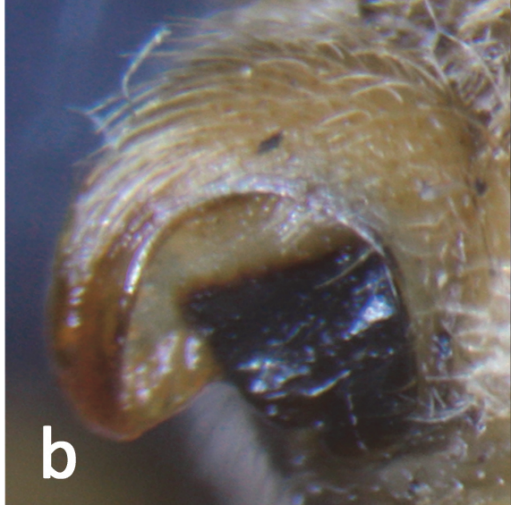


Fig. 1: Mongolian *Argiope lobata* (PALLAS, 1772), ♀, epigyne: **a** ventral view; **b** lateral view.



Fig. 2: *Argiope lobata* (PALLAS, 1772) *in situ*, ♀, ventral view.

The arachnofauna of Mongolia is relatively well studied. No checklist is published yet; however, there are more than 500 spider species inclusive varieties described in literature in sum (Y. M. MARUSIK, Russian Academy of Science, Magadan, pers. communication). As a review of the history concerning the Mongolian arachnology, we refer to MARUSIK & LOGUNOV (1998, 2006).

Mongolian-German Biological Expeditions during the 80s established important spider collections (HEIMER 1985, 1987). Among other research issues, the joint Mongolian-German Biological Expedition conducted in 2009 pursued old traditions by collecting arachnids in Mongolia (WALL 2011).

In this paper, we present a result of this expedition during which a representative of the araneid subfamily Argiopinae was collected for the first time in Mongolia.

Material and methods

The obtained specimen was collected and stored within 70 % ethanol. After returning to Germany, photographs were taken using a Canon EOS 650D-camera and measurements were performed using a digital micrometer gauge. In this work, we present all measurements (mm) according to DI POMPEO et al. (2011): L (1-4) femur-patella-tibia-metatarsus-tarsus (total). Additionally we give results for total length (TL) and the length of the cephalothorax (CL).

For species determination, we used a Seben binocular microscope Incognita III and applied determination keys of BJØRN (1997) and NENTWIG et al. (2013). As differentiation to *Argiope ahngerii* SPASSKY, 1932 we used an unpublished scheme drawn by Y. M. MARUSIK in the first place and compared the specimens' epigyne with the drawing in SPASSKY (1932). To cover for the result we asked Prof. Dr. J. SCHNEIDER (University of Hamburg) to send us two female *A. lobata*-specimens out of her collection. Those specimens were used as direct comparison referring mainly to the epigynal structures. All specimens, including the Mongolian one, are deposited in the Zoological Collection of the Central Repository of Natural Sciences (CRNS) of the Martin-Luther-University Halle-Wittenberg (MLU).

Comparing the epigynal structures of both, the reference spiders and the unidentified one, and aligning the photographs with illustrations depicted within BJØRN (1997) and NENTWIG et al. (2013) no obvious morphological differences were found (fig. 1 a, b). Later Dr. Y.M. MARUSIK examined the specimen personally.

Results

One adult female of *A. lobata* was collected by the authors through hand-sorting during the day on 2 August 2009 (fig. 2). The site of collection (43°54'N 107°43'E; 1040 m a.s.l.) is characterised by rocky terrain for several square kilometres along a dry riverbed (figs. 3-4). A high number of different arthropod taxa could be observed and collected nearby, although there has been just sparse vegetation present.

The specimen was found in 50 cm height above the ground at the basis of a wall of rock out of brown granite in a get-at-able crevice sitting on the underside of its web, which was situated almost parallel to the ground. In an *Argiope*-species-specific manner, it posed in the centre of its web with the head facing downwards and the legs L1-L2 and L3-L4 pairwise stretched out.

The TL of the specimen measures around 17.4 mm, while the CL states 6.8 mm. Referring to the leg measurements we present following data: L1-10.0-3.1-7.8-10.4-1.8 (33.1); L2-10.1-2.8-7.6-10.4-2.5 (33.4); L3-6.8-2.1-3.3-5.4-1.8 (19.4); L4-10.6-2.8-6.1-9.9-2.3 (31.7).

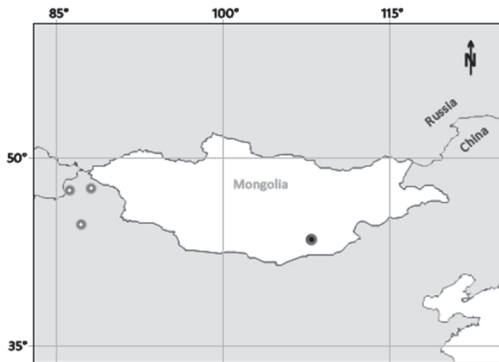


Fig. 3: Distribution records of *Argiope lobata* (PALLAS, 1772) in Eastern Asia. Circles with white dots = localities of records cited from WEN-GUI & JIN-LIN (1989); circle with black dot = locality of first record for Mongolia.



Fig. 4: Rocky habitat of the specimen found in the Eastern Gobi of Mongolia, 1040 m a.s.l

Discussion

No species of the Argiopinae have been recorded in Mongolia before and closest evidence for *A. lobata* was found in Xinjiang Uygur in Northwest China ca. 1,600 km far from the record presented here (WEN-GUI & JIN-LIN 1989, Fig. 3). Despite ATAKUZIEV & YUKEL'SON (1996) mention an "*A. mongolicus*", no such species or synonym in the genus *Argiope* is known (PLATNICK 2013). With respect to the fairly large distribution range of *Argiope lobata* in the old world this record is the eastern most known to arachnology until now.

We doubt the record of *A. lobata* for New Caledonia mentioned in LEVI (1983), which is based on the catalogue of ROEWER (1942). In addition, PLATNICK (1993) listed *A. lobata* for that island, but the record is most probably based on the same catalogue and an explicit reference is not given. In his recent review, JÄGER (2012) doubts records from Indonesia, Australia and New Caledonia and assumes wrong labelling as a possible explanation for any confusion. Even LEVI (1983: 254 f.) seemed not to be convinced, when he stated that *A. lobata* has a distribution "(...) perhaps [including] New Caledonia, Australia, and Africa; (...)". Whereas parts of Africa definitely belong to the distribution range of *A. lobata*, *Argiope* specimens from New Caledonia, Australia and Indonesia probably represent other species with lobed abdominal figures, but not *A. lobata* (PALLAS, 1772).

Personal observations and pit fall traps close to the finding spot of the Mongolian *A. lobata* specimen showed a higher number of arthropod taxa than in the semi-desert surroundings. These are able to survive harsh conditions of the Eastern Gobi by living close to water or habitats containing vegetation like a dry riverbed. Many insects caught or observed near the finding spot of the *Argiope lobata* specimen represent typical prey for *Argiope* spec. consisting of Orthoptera, Hymenoptera and Diptera (NENTWIG 1985, NYFFELER & BENZ 1978). The rocky terrain consisting of crevices and coves grants protection of both desiccation and physical manipulation by strong winds. It is possible, that locations like this are the typical habitats for some orb-web weaving spiders, although other large representatives of the Araneidae and Tetragnathidae observed in this area were situating their webs freely far away from crevices or coves.

It is not possible to give a statement about the interspecific concurrence existing within spiders at this spot belonging to the orb-weaving guild, yet. Furthermore, it cannot be said, how large the population of *Argiope lobata* is in reality as just one specimen has been obtained. The expedition members didn't perform further studies about the density and quality of this population. The specimen

might have been wind-transported and as such could be an exceptional record. However, we do not consider human-mediated introduction of egg sacs or adults as a probable reason for the recent record, because of the remote location far from any human settlement or infrastructure. To fill this gap of knowledge collecting more specimens of this lobed spider in the Eastern Gobi is recommended to perform proper population genetics. KREHENWINKEL & TAUTZ (2013) recently demonstrated that it would be interesting to look deeper into the genetics and distribution patterns of a widespread and well-known spider of the *Argiope* genus. They explained that recent invading behaviour of *Argiope bruennichi* in Europe underlies a shift within the temperature niche and that mechanisms like this may be major key adaptations for survival in northern latitudes.

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References

- ATAKUZIEV, B.U.; YUKEL'SON, L.Y. (1996): Structural-functional characteristics of toxins from spiders of the Araneidae family. - Chem. Nat. Compd. **32**: 896–899.
- BELLMANN, H. (2001): Kosmos-Atlas Spinnentiere Europas. Stuttgart.
- BJØRN, P.P. (1997): A taxonomic revision of the African part of the orb-weaving genus *Argiope* (Araneae: Araneidae). - Entomol. Scand. **28**: 199–239.
- DI POMPEO, P.; KULCZYCKI, A.; LEGITTIMO, C. M.; SIMEON, E. (2011): New records for Europe: *Argiope trifasciata* (Forsskål, 1775) from Italy and Malta (Aranae, Araneidae). - Bull. Brit. Arachnol. Soc. **15**: 205–208.
- HEIMER, S. (1985): Über die Aufsammlung von Spinnen (Arachnida: Araneae) durch die Mongolisch-Deutschen Biologischen Expeditionen in den Jahren 1977 bis 1979. - Mitt. Zool. Mus. Berlin **61**: 143–145.
- HEIMER, S. (1987): Neue Spinnenarten aus der Mongolei (MVR) (Arachnida: Araneae: Theridiidae et Linyphiidae). - Reichenbachia **24**: 139–151.
- JÄGER, P. (2012): A review in the spider genus *Argiope* Audouin 1826 with special emphasis on broken emboli in female epigynes (Araneae: Araneidae: Argiopinae). - Beitr. Araneol. **7**: 272–331.
- KREHENWINKEL, H.; TAUTZ, D. (2013): Northern range expansion of European populations of the wasp spider *Argiope bruennichi* is associated with global warming-correlated genetic admixture and population-specific temperature adaptations. - Mol. Ecol. doi: 10.1111/mec.12223
- LEVI, H. W. (1983): The orb-weaver genera *Argiope*, *Gea*, and *Neogea* from the western Pacific Region (Araneae: Araneidae, Argiopinae). - Bull. Mus. Comp. Zool. **150**: 247–338.
- MARUSIK, Y.M.; LOGUNOV, D.V. (1998): On the spiders (Aranei) collected in central Mongolia during a joint American-Mongolian-Russian Expedition in 1997. - Arthrop. Sel. **7**: 233–254.
- MARUSIK, Y.M.; LOGUNOV, D.V. (2006): On the spiders collected in Mongolia by Dr. Z. Kaszab during expeditions in 1966–1968 (Arachnida, Aranei (excluding Lycosidae)). - Arthrop. Sel. **15**: 39–57.
- MARUSIK, Y.M.; KOPONEN, S. (2005): A survey of spiders (Araneae) with Holarctic distribution. - J. Arachnol. **33**: 300–305.
- NENTWIG, W. (1985): Prey analysis of four species of tropical orb-weaving spiders (Araneae: Araneidae) and a comparison with araneids of the temperate zone. - Oecologia **66**: 580–594.
- NENTWIG, W.; BLICK, T.; GLOOR, D.; HÄNGGI, A.K.; KROPF, C. (2013): Araneae - Spinnen Europas. - Version 1.2013, - online at <http://www.araneae.unibe.ch> (4.1.2013).

- NYFFELER, M.; BENZ, G. (1978): Die Beutespektren der Netzspinnen *Argiope bruennichi* (Scop.), *Araneus quadratus* Cl. und *Agelena labyrinthica* (Cl.) in Ödlandwiesen bei Zürich. - Rev. Suisse Zool. **85**(4): 747–757.
- PLATNICK, N.I. (1993): The araneomorph spider fauna of New Caledonia. - Biodiversity Letters **1**: 102-106.
- PLATNICK, N.I. (2013): The world spider catalog, version 14.0. - American Museum of Natural History, online at <http://research.amnh.org/entomology/spiders/catalog/index.html>; DOI: 10.5531/db.iz.0001.
- ROEWER, C.F. (1942): Katalog der Araneae. - Berlin, R. Friedländer und Sohn **1**: 1-1040.
- SCHARF, N.; CODDINGTON, J. A. (1997): A phylogenetic analysis of the orb-weaving spider family Araneidae (Arachnida, Araneae). - Zool. J. Linn. Soc. **120**: 355-434.
- SILIWAL, M.; MOLUR, S. (2007): Checklist of spiders (Arachnida: Araneae) of South Asia including the 2006 update of Indian spiders checklist. - Zoos Print J. **22**: 2551–2597.
- SPASSKY, S.A. (1932): Araneorum species novae. - Bulletin du Museum D'Historie Naturelle Paris **(2)4**: 182-189
- WALL, M. (2011, unpubl.): Die Spinnenfunde der Mongolisch-Deutschen Expedition 2009 - Eine Dokumentation der Morphospecies. - B.Sc. thesis, MLU Halle-Wittenberg.
- WEN-GUI, W.; JIN-LIN, H. (1989): Spiders from agricultural regions of Xinjiang Uygur Autonomous Region, China (Arachnidae: Araneae). - Jinan, Shandong University Publishing House.

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