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## A new *Arum* species (*Areae*, *Araceae*) from NE Turkey and Georgia

### Abstract

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*Arum megobrebi* is described as a new species of *A. subg. Arum* from NE Turkey and central S Georgia and illustrated. It takes to 29 the number of species currently recognised for the genus. It is closely related to but easily distinguished from *A. maculatum* by, in particular, its elongate-cylindrical appendix of the spadix.

Key words: aroids, *Arum* subg. *Arum*, *Arum megobrebi*, Caucasus, taxonomy.

### Introduction

In 1990, Manfred Koenen, then horticulturist at the Botanic Gardens Bonn, collected rhizomes from an *Arum* in a remote area of NE Turkey. Being aware that this might turn out to be an interesting collection, one year later Mr Koenen returned to the area and was able to collect more material. When the plants flowered a few years later in the Botanic Gardens Bonn, the first two authors were not sure about its identity. Knowing that Peter Boyce was then working on a monograph on the genus *Arum*, we wanted to wait until the book was published. However, by certain circumstances, we lost the potential new species from our minds.

In 2003, Andreas Gröger from Munich, the first author and Zurab Schewardnadse from Tblissi were collecting plants in Georgia. Among other material, an *Arum* was collected and brought to the Botanic Gardens Bonn. It flowered in 2004, at which point we realized that it was the same species as the material gathered more than ten years earlier by M. Koenen. Having compared our plants with the *Arum* monograph by Boyce (1993), it appeared rather certain that it represents an undescribed taxon. Adding the expertise of the last two authors, it is here described as a new species of *A. subg. Arum*.

As currently defined, *Arum* comprises 28 species (Boyce 1993, 1996, 2006), although, as noted by Boyce (2006), much remains to be done before it can be claimed that *Arum* is well understood. The recognition of a new species in the taxonomically difficult *A. subg. Arum* may well seem a taxonomically risky step but at this time we cannot fit this clearly distinct plant into any of the currently recognized species and thus it seems useful to give it formal recognition with the caveat that at some future date a critical revision may well result in changes to its taxonomic status.



Fig. 1. *Arum megobrebi* in the Surami Mts, central S Georgia – A: plants in its natural habitat; B: inflorescence with possible pollinator; C: infructescence. – Photographs: A by D. Rafiqpoor, 31.5.2007; B by J. Obholzer, 25.5.2007, C by M. Neumann, 8.2006.

*Arum megobrebi* Lobin, M. Neumann, Bogner & P. C. Boyce, **sp. nov.**

Holotype: Georgia, Imeretia, westside of Surami Mountains, near Chewi, W of street-tunnel, W of the pass, 42°4.863'N, 43°28.520'E, 690 m, 25.5.2007, A. Gröger & W. Lobin (TBI; isotypes: B, BM, BONN, E, FR, K, LE, M).

Ab *Aro maculato* foliis duobus (versus foliis 4-6) et spadiceis appendice elongate cylindrica vel raro leviter clavata, haud stipitata (versus valde clavata, distincte stipitata) differt.

Seasonally dormant slender herbaceous plant to 40 cm tall. *Shoots* usually with only two leaves and beginning growth in early spring. *Stem* a horizontal rhizomatous tuber, 3.5-5 cm long and (1-)1.5-2 cm in diam., brown outside, not clump-forming and always growing solitary; roots on apical part of tuber. *Petioles* (18-)19-30(-40) long, 2-3 mm in diam. above and 3-4 mm below, flattened on upper side, green to reddish tinged or red, especially on lower part; sheath 6-9(-12) cm long and to 5 mm wide. *Leaf blades* ± sagittate to hastate (somewhat variable), 7-13(-17) cm long and 5-8(-10) cm wide, apex acute and only rarely obtuse, basal lobes obtuse to acute; venation reticulate, midrib strong, 4-5(-6) primary lateral veins on each side and each of the lowermost ones running into the basal lobes, then divided shortly from the midrib, primary lateral veins forming an inner collective vein 3-5 mm from the margin, veins of second order thinner between the primary and forming a net, outer collective vein much thinner and very close (0.3-0.4(-0.5) mm) along the margin, third order veins very thin, reticulate and anastomosing. *Inflorescence* solitary, foul-smelling. *Cataphylls* (4-)6-12(-18) cm long, membranaceous. *Peduncle* (5-)6-12(-15) cm long and 2-2.8 mm in diam., terete, rarely green but mostly reddish to red, shorter than petioles. *Spathe* (10-)12-15(-17) cm long, constricted, outside greenish to whitish green, inside the same colour, margin often reddish, or outside and inside purplish tinged (some specimens); (lower) tube convolute, (1-)1.5-2 cm long and 1-1.5 cm in diam., inside whitish and with a broad ring-like purple zone or nearly completely purple, constriction 0.8-1 cm in diam.; limb 8-14(-15) cm long and 2.5-3 cm wide in the middle, apex acuminate. *Spadix* much shorter than spathe, 8-10 cm long; female zone 0.7-0.8 cm long and c. 0.5 cm in diam.; sterile flowers between female and male flowers in 2 circles or rows, this zone c. 2 mm long; male zone c. 0.4 cm long and 0.4 cm in diam.; sterile flowers above male flowers in c. 3 spiral rows and this zone c. 3 mm long; appendix elongate-cylindric (not stipitate and never strongly clavate, only rarely very slightly clavate), (5-)6-8 cm long and 2-3 mm in diam., smooth, purple. *Flowers* unisexual; *female flowers* ± ovoid, 1.8-2 mm in diam.; ovary greenish (light coloured), styler region purple, stigma discoid, 0.5-0.6 mm in diam.; *male flowers* with stamens c. 0.5 mm long and wide, purple, thecae opening by a very broad slit, pollen yellow, pollen grain inaperturate, spherical, 28-29 µm in diam., exine spinose, spines short and broad at base, c. 1 µm long, surface of exine granulate; *sterile flowers* of both zones of the same structure, bulbous at base and ending in a long filiform part, bulbous base c. 1 mm in diam., greenish to reddish, thread-like part to 5 mm long and deep purple. *Infructescence* with (13-)19-21(-25) orange-red berries; peduncle of infructescence 4-5 mm in diam. (measurements from fresh material), green; spathe dried and fallen completely by fruiting stage, only sometimes small remnants of it at the base of the infructescence. *Berries* somewhat irregularly depressed-globular to ± obovoid, with brown stigma remnant (this slightly sunken apically on the berry); fully developed berries 7-8 mm in diam., with only 1 or 2 seeds. *Seed* ellipsoid to ovoid, 4.5-5.5 mm long and 4-5 mm in diam., light brown, with a strophiole at the hilum and usually very slightly pointed at the micropyle; testa strongly rugulose-reticulate, hard, 0.8-1 mm thick (basally always somewhat thicker); endosperm copious, white; embryo small. – Fig. 1-2.

*Etymology.* – In Georgian language the epithet “megobrebi” stands for “friend”. The first author has chosen this name to honour the good relations between the botanical gardens Tblissi, Bonn and Munich. Since 1999 a close cooperation between these gardens has existed and a number of excursions have been taken place. Jimsher Kereselidse, the former director of and Lamara Asieshvili from Tblissi Botanic Garden as well as Zurab Schewardnadse, Tblissi, helped in various ways. The good company of Andreas Gröger, Munich Botanic Garden, is especially acknowledged.

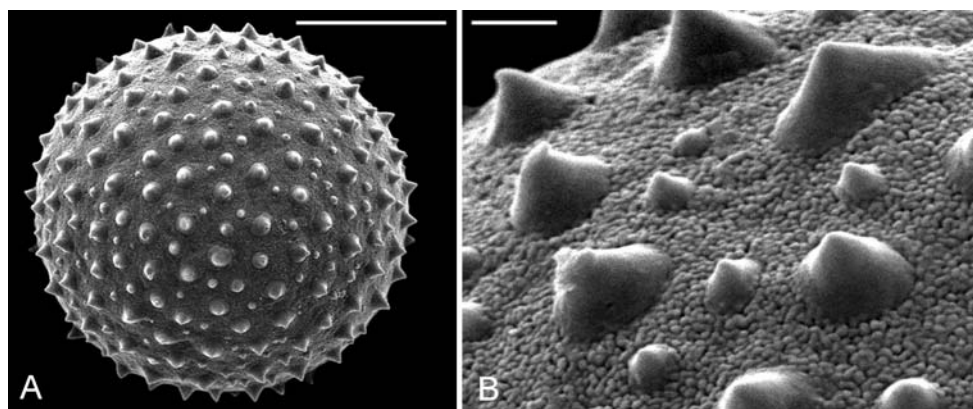


Fig. 2. *Arum megobrebi*, pollen – A: overview; B: detail. – SEM micrographs by Dr Heidemarie Halbritter (Wien).

*Distribution and ecology.* – *Arum megobrebi* is so far known from the mountains bordering the Black Sea in NE Turkey and from neighbouring Georgia.

In Georgia, the species grows in deciduous mixed forests at an altitude from about 200 m to over 2400 m. Near Didgori the tree layer is dominated by *Fagus orientalis* Lipsky, *Carpinus orientalis* Mill. and *Acer trautvetteri* Medv. The vegetation of the herb layer was surveyed after Braun-Blanquet (1964) in a 2 × 2 m square (Table 1). Near Adjani, the surrounding forest has a tree layer of *Fagus orientalis*, *Castanea sativa* Mill., *Tilia caucasica* Rupr. and *Alnus glutinosa* subsp. *barbata* (C. A. Mey.) Ledeb. The shrub layer consists of predominately evergreen species, such as *Prunus laurocerasus* L., *Rhododendron ponticum* L. and *Ilex colchica* Pojark., among them with single remarkably old and tall individuals of *Taxus baccata* L. Evergreen lianas, such as *Hedera colchica* (K. Koch) K. Koch and *Smilax aspera* L., are also found. The humidity of this locality is indicated by the occurrence of seventeen fern species, including *Hymenophyllum tunbrigense* (L.) Sm.

*Arum megobrebi* grows in Georgia always in pure populations and occurs not sympatrically with any other *Arum* species.

*Additional specimens and cultivated plants studied.* – TURKEY: Artvin, above Çamli, 2420 m, 26.5.1990, M. Koenen 20\*90\*K (cult. in BG Bonn, accession number 8404-1-1990); Trabzon - Gümüşhane borders, between Kayaıçı Köy and Yağmudere, 1550 m, 14.6.1991, V. Haller & M. Koenen 36\*91\*TR H\*K (cult. in BG Bonn, accession number 9824-1-1991). — GEORGIA: Kartli,

Table 1. Vegetation of the herb layer in a 2 × 2 m relevée in the deciduous mixed forest at Didgori, hill slope, vegetation cover 80 %.

Species	Cover percentage after Braun-Blanquet (1964)
<i>Arum megobrebi</i>	4 (70 %)
<i>Corydalis</i> cf. <i>cava</i> (L.) Schweigg. & Körte	2 (20 %)
<i>Anemone</i> sp.	1 (> 5 %)
<i>Paris incompeta</i> M. Bieb.	+ (< 5 %)
Apiaceae indet.	+ (< 5 %)
<i>Dryopteris filix-mas</i> (L.) Schott	one plant
<i>Dentaria</i> cf. <i>bulbifera</i> L.	1 (> 5 %)
<i>Pachyphragma macrophylla</i> (Hoffm.) Busch	+ (< 5 %)
<i>Geranium robertianum</i> L.	1 (> 5 %)
<i>Acer trautvetteri</i> Medv.	seedling

environs of Tbilisi, Didgori Monument, 41°45.622'N, 44°30.761'E, 1630 m, 30.7.2003, A. Gröger & W. Lobin 302-5 (cult. in BG Bonn, accession number 24219-1-2003); *ibid.*, 1.6.2007, E. Fischer, A. Krämer, W. Lobin, D. Rafiqpoor & Z. Schewardnadse (B, BM, BONN, FR, K, M, TBI); Kartli, near Sedaseni, path from church through forest, 41°52.208'N, 44°46.314'E, 27.5.2007, W. Lobin & A. Gröger (M); Adjaria, Dekhva valley N of Batumi, 41°45.174'N, 41°50.110'E, 23.5.2007, A. Gröger & W. Lobin (B, M).

*Relationship and delimitation.* – *Arum megobrebi* belongs to *A.* subg. *Arum* by virtue of the horizontal rhizomatous tubers. After Boyce (1993) *A.* subg. *Arum* comprises four species, *A. byzantinum* Blume, *A. concinnatum* Schott, *A. italicum* Mill. and *A. maculatum* L. Based on overall morphology, *A. megobrebi* appears to be very close to *A. maculatum*, but can be easily distinguished by the elongate-cylindric spadix appendix, which is never stipitate and clearly clavate as in *A. maculatum*; this character can be always very easily observed. The appendix is purple as in *A. maculatum*, as are also the male flowers. The solitary habit and plants bearing only two leaves are also noteworthy; in contrast, *A. maculatum* is a colony-forming species and individual plants are invariably with 4-6 leaves.

There is some similarity also to *Arum italicum*, but the latter may be readily separated by the yellowish clavate appendix and the yellowish male flowers.

*Arum byzantinum* is endemic to a small area of the Balkan Peninsula between Bulgaria and Istanbul and has a brownish purple, strongly clavate appendix. *A. concinnatum* is essentially an E Mediterranean species, particularly abundant on Crete, and has a very robust and long (equaling the spathe limb), cylindrical-clavate appendix. A further distinguishing feature is that *A. byzantinum*, *A. concinnatum* and *A. italicum* emerge in autumn, whereas *A. megobrebi* and *A. maculatum* begin growth in late winter or very early spring.

## Acknowledgements

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