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Revision of Genus *Polygonum* L. s.l. in Flora of Armenia

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***Abstract*—**The account of genus *Polygonum* L. in "Flora of Armenia" was made more than five decades ago. After that many expeditions have been carried out in different regions of Armenia and a huge herbarium material has been collected. The genus included 5 sections with 20 species. Since then many authors accepted the sections as separate genera on the basis of anatomical, morphological, palynological and molecular data. According to the above mentioned it became clear, that the taxonomy of Armenian representatives of *Polygonum* s. l. also needs revision. New literature data and our investigations of live and herbarium material (ERE, LE) with specification of the morphological characters, distribution, ecology, flowering and fruiting terms brought us to conclusion, that genus *Polygonum* s. l. has to be split into 5 different genera (*Aconogonon* (Meisn.) *Reichenb*., Bistorta (L.) Scop., *Fallopia* Adans., Persicaria Mill., *Polygonum* L. s. s.). The number of species has been reduced to 16 species. For each genus new determination keys has been created.

Keywords*—Aconogonon* (Meisn.) Reichenb., Bistorta (L.) Scop., Fallopia Adans., Persicaria Mill., Polygonum L. s. s., Flora of Armenia.

I. Introduction

THE last arrangement of genus Polygonum has been made in 1956 in “Flora of Armenia” [1], which included 5 sections and 20 species. Later a number of collections has been implemented from different regions of Armenia, and besides, different authors, on the basis of the anatomical, morphological, palinological, and molecular investigations [2]-[8], have made some changes in the nomenclature of the genus. Taking into account everything mentioned above the need for revision of this group was evident. With that aim a big literature has been checked, the herbarium material of Instutute of Botany NAS RA (ERE) and Botanical Institute of Saint Petersburg (LE) has been investigated, the new material from Armenia has been identified, the morphological features, distribution, flowering and fruiting times has been specified and some nomenclature inaccuracies has been corrected. Thus, the genus *Polygonum* L. has been divided into 5 genera: *Aconogonon* (Meissn.) *Reichenb*., *Bistorta* (L.) Scop., *Fallopia* Adans., *Persicaria* Mill. and *Polygonum* s.s., which accord to sections, accepted before. For these genera we have accepted 16 species and created determination keys. Below we will bring some comments on most interesting species.

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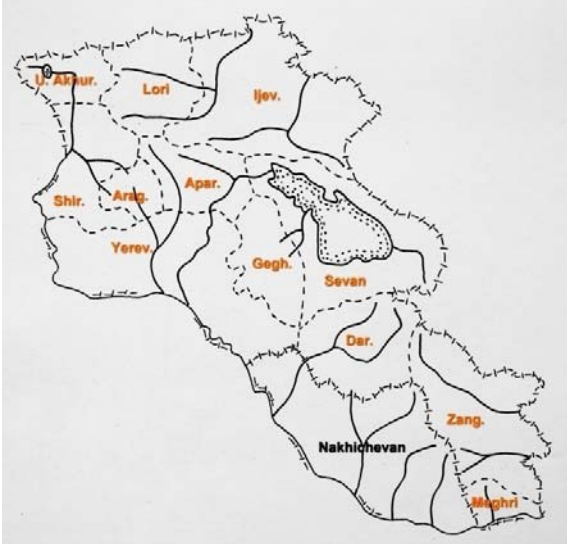


Fig. 1 The map of floristic regions of Armenia

Polygonum alpinum All. is removed to genus *Aconogonon* and renamed to *Aconogonon alpinum* (All.) Schur (Fig. 2). It is distributed in all floristic regions of Armenia [9] (Fig. 1).



Fig. 2 *Aconogonon alpinum* (All.) Schur

Our investigations showed, that the species, called *Polygonum carneum* C. Koch was in reality *Polygonum bistorta* L. There was a difficulty to understand the differences between *Polygonum carneum* and *Polygonum bistorta*, which,

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according to original descriptions differ with color of perianth (bloody pink and pink) and mate and glossy fruits, respectively. After long investigation of herbarium material we came to conclusion, that the fruits are mate when unripe, and in ripe condition they become glossy. Besides, all the flowers of investigated material were pink, which accords to *Polygonum bistorta* and nowadays is included in genus *Bistorta* and is renamed to *Bistorta officinalis* Delarbre (Fig. 3). This species is distributed in all floristic regions of Armenia.



Fig. 3 *Bistorta officinalis* Delarbre

The genus *Fallopia* includes 2 species: *F. convolvulus* (L.) A. Löve (Fig. 4) and *F. dumetorum* (L.) Holub (Fig. 5). *F. convolvulus* occurs in all floristic regions of Armenia, while *F. dumetorum* occurs only in Ijev. and Dar. floristic regions. The main differences between these two species are absence/presence of wings on the perianth, mate and glossy fruits respectively and the articulation place of peduncle-perianth.



Fig. 4 *Fallopia convolvulus* (L.) A. Löve



Fig. 5 Fallopia dumetorum (L.) Holub

The genus *Persicaria* Includes 5 species, previously included in section *Persicaria* Meisn.: *P. amphibia* (L.) Gray, *P. hydropiper* (L.) Spach, *P. lapathifolia* (L.) Gray. *P. maculata* Gray and *P. minor* (Huds.)

Two species, registered in "Flora of Armenia" - *Polygonum nodosum* Pers. and *Polygonum tomentosum* Schrank we accept as the same species and include in polymorphic and systematically difficult species *Persicaria lapathifolia* (L.) Gray. (Fig. 6), which occurs in Lori, Ijev., Apar., Sevan, Yerev., Dar., Zang. and Meghri floristic regions.



Fig. 6 *Persicaria lapathifolia* (L.) Gray

There was only one specimen of *Persicaria minor* Huds. (Opiz.) (= *Polygonum minor* Huds.) (Fig. 7) in ERE, collected from lakes shores in Stepanavan city surroundings. To confirm the presence of this species in Armenia an expedition to Lori region has been organized and the species was really found.

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Fig. 7 *Persicaria minor* Huds. (Opiz.)

We didn't find any specimen of *Polygonum arenarium* Waldst. et Kit. from Armenia, so this species is excluded as well.

We had difficulties to understand what is *P. aviculare* L., as the descriptions of the species were different in different literature. It came out, that the species, called *P. aviculare* on the territory of USSR was accepted in western countries as *P. arenastrum* Boreau (Fig. 8). According to decision of International Committee of Plants Nomenclature the name *P. aviculare* is left for the heterophyllous species, which was accepted as *P. heterophyllum* on the territory of USSR [10]. Our investigations showed, that only *P. arenastrum* occurs in Armenia in all floristic regions.



Fig. 8 *Polygonum arenastrum* Boreau

The species *Polygonum luzuloides* Jaub. Et Spach., mentioned in "Flora of Armenia" we accepted as *P. setosum* Jacq. (Fig. 9), described earlier, as, according to original description, these two species differ only with leaves width (1-2 mm), which we don't accept as a species determining feature. The species can be found in Apar., Dar., Zang., Meghri floristic regions.



Fig. 9 *Polygonum setosum* Jacq

There are only 2 specimens of *P. polycnemoides* Jaub. et Spach (Fig. 10) found in ERE. Some specimens of *P. paronychioides* C. A. Mey. have been wrongly determined as *P. polycnemoides*. The species hasn't been collected during last 60 years. It occurs only in Yerev. and Dar. floristic regions.



Fig.10 *Polygonum polycnemoides* Jaub. et Spach

We excluded species *Polygonum tiflisiense* Kom., as we found no differences with *Polygonum bellardi* All. At the same time we included *P. bellardi* in *P. patulum* Bieb. as a subspecies, because we didn't find clear features to separate these two taxa on species level. *P. patulum* can be found in Yerev., Sev., Dar., Ijev., Apar., Zang., Megri floristic regions.

II. Methods

During our study a new material has been collected from different regions of Armenia, the GPS coordinates recorded and photographs made. After the material has been dried, it has been investigated for morphology and determined together with already existing herbarium material in ERE and LE.

III. Results and Discussion

The genus *Polygonum* L. s.l. is divided into 5 genera - *Aconogonon* (Meisn.) *Reichenb*., *Bistorta* (L.) Scop., *Fallopia* Adans., *Persicaria* Mill., *Polygonum* L. s. s., which include 16 species, instead of 20, mentioned in 2nd volume of "Flora of Armenia".

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