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FLORISTICAL STUDIES IN THE YEREVAN BASIN, ARMENIA

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Floristical data, collected by the author in August, 1987 at Yerevan and Garni, Armenia, are presented. The flora list consists of 200 taxa, which includes 9 endemic species. The species list contains new floristical records to the visited areas of Armenia: *Bromus inermis* L., *Euphorbia orientalis* L., *Festuca pratensis* Huds., *Glycyrrhiza glandulifera* Waldst. et Kit., *Salsola kali* L., *Secale segetale* (Zhuk.) Roshev., *Sonchus oleraceus* L.

Key words: vascular plants, Armenia, Yerevan basin, Garni nature conservation area

INTRODUCTION

On the basis of an agreement between the Department of Nature Geography of the Eötvös Loránd University and that of the Yerevan University I participated in a field-work in 1987. In the course of the geographical field practical I had the opportunity of making a botanical collection, too. The area we have worked on included the countryside of Yerevan, the Lake Sevan and the valley of River Hrazdan.

MATERIALS AND METHODS

In this report I publish the data on collected material from Yerevan and its countryside, (see the Appendix for the list of collected plants). For the taxonomic identification works of SOÓ and JÁVORKA (1951), TAKHTAJAN and FEDOROV (1972), TAKHTAJAN (1966, 1980, 1987) and GROSSGEJEM (1949) were used. Nomenclature follows TAKHTAJAN and FEDOROV (1972).

NATURAL CONDITIONS

The part of the Armenian highland is typical of various climatic conditions, configuration of the mountain and botanical diversity. These areas are characterized by very different climatic conditions involved by great differences in the

altitude, in large variety of formation of basins and valleys and that of mountains and hills. The formation of zones is in accordance with the height (from the semidesert to the cold mountain zones). To North-East and South-East, in a narrow belt the subtropical monsoon climate is prevailing. There are significant differences in the microclimate of the zones as a consequence of the geomorphological differences within the zones. In accordance with these factors different coenological types, rich and diversified in endemic species, are present. Twenty per cent of the local flora consist of endemic taxa. There are 10 endemic species in the list below, in spite of human perturbations of the area. The vegetation zones of Armenia, together with climate diagrams are shown in Fig. 1.

Yerevan

The town is situated between the semidesert and the steppe-areas, which is shown by mixture of the plant species of the two zones. Furthermore, the valley of River Hrazdan, the alkaline and wet lands, the areas exposed to the human per-

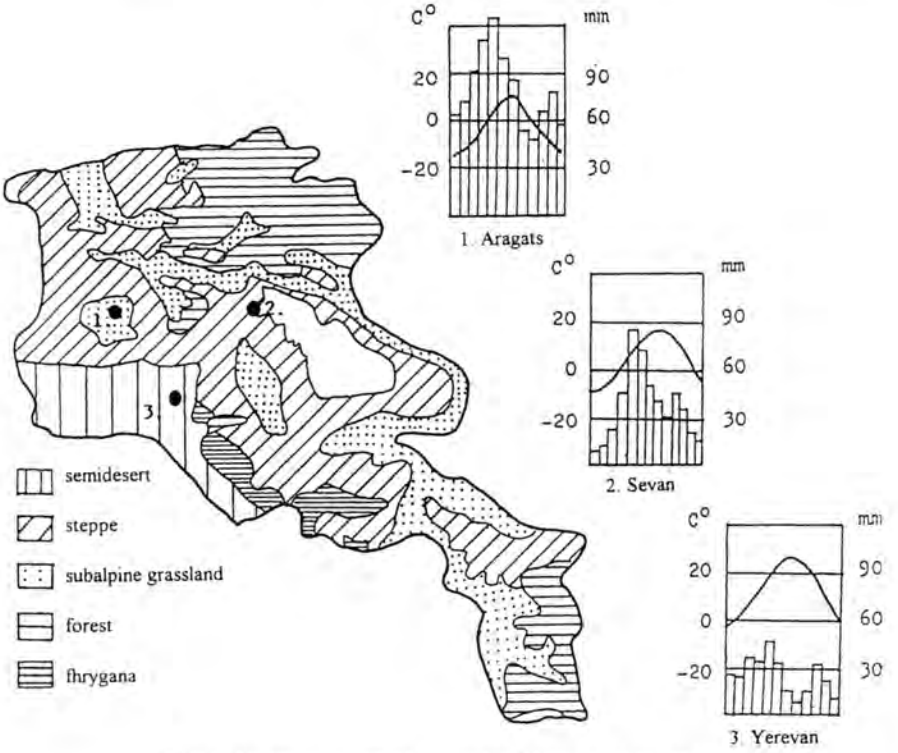


Fig. 1. Vegetation map of Armenia (BAGDASARIAN 1966)

turbations influence the view of vegetation. I could visit River Hrazdan only once and for that reason rather small number of species were collected there. I got a deeper insight into the vegetation of the environs of the Campus at the north-eastern part of the town, where most of the area were occupied by weeds (*Amaranthus blitoides*, *Bromus tectorum*, *Erigeron canadensis*, etc.). At the same time, the occurrence of some endemic species (*Helichrysum armenium*, *Marrubium parviflorum*) indicated the features of the original flora. Such species were the *Limonium meyeri* occurring at the edge of wet plots and the *Glycyrrhiza glandulifera* present in large number.

Valley of River Azat

The Garni nature conservation area, which is the paradise of basalt forms, is situated NE of Yerevan. It is characterized by remnants of vents, uplands and canyons, several hundred metres deep. When I started the work by the investigation of the upland at the beginning of August, the vegetation was almost completely desiccated. Apart from the green patches of *Crataegus calycina*, the thorny *Plumbago europaea* and the felt-like hairy *Nepeta mussinii* were flowering, only. The vegetation was formed largely by fruiting individuals, or dry stalks. In addition to *Poa bulbosa* and *Agropyron repens*, the annual *Secale vavilovii* and the perennial *Secale segetale* (new data on its location), growing to the height of 1 m, were present, too. From the Compositae family, two giant *Centaurea* species (*C. carduiformis*, *C. behen*) emerged from their environs. Identification of *Stizolophus balsamita* was easy by its strange shaped involuclar bracts. The *Cnicus benedictus*, which is a cultivated herb in Hungary, was frequent. From the Dipsacaceae family, *Scabiosa argentea*, *S. bipinnata* and the annual *S. rotata*, common everywhere in Armenia, were found in the field. Near the tracks, the appearance of *Echium italicum* and *Astrodaucus orientalis*, – latter is a common Umbelliferae species in that area – were observed, together with the *Zosima obsinthifolia*. This composition of the flora is characteristic of the steppe, although the occurrence of Papilionaceae was not as frequent as expected.

In the canyons the flora considerably differs from that of the upland described above. Only a few species are able to survive on the dry, rocky sides of mountains. Among the dwarf shrubs, *Herniaria hirsuta*, *Teucrium polium*, *Thymus kotschyanus* and *Telephium imperati* L. subsp. *orientale* (two Caryophyllaceae and two Labiatae) were able to survive under the extreme environmental conditions.

There was a green strip on the bottom of the canyon, along the riverside (River Azat), where the yellow blossom endemic *Michauxia laevigata* (Campanulaceae) and the giant specimens of *Inula helenium* were present.

It may be worth of mentioning the two microscopic fungi, I found on the collected plant material. According to the identification, carried out by Sándor TÓTH (Department of Botany and Plant Physiology, Agricultural University, Gödöllő), these were the *Pleospora tragacanthae* Rabh. (on the thorns of *Astragalus strictifolius*) and the *Uromyces trifolii-hybridi* Paul (on *Trifolium fragiferum* subsp. *bonannii*).

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APPENDIX
List of collected plants

Sites: I/a – Yerevan (valley of River Hrazdan); I/b – Yerevan (near the Campus); II – 15 km NE of Yerevan; III/a – Garni (basalt plateau); III/b – Garni (rocky hill-side); III/c – Garni (valley of River Azat); * = endemic species; + = new data to habitat.

GYMNOSPERMATOPHYTA
Ephedropsida
Ephedraceae
Ephedra major Host subsp. *procera* (Fisch. et C. A. Mey.) Markgraf – III/c

ANGIOSPERMATOPHYTA
Dicotyledonopsida
Helleboraceae
Consolida divaricata (Ledeb.) Schroeding – I/b
C. orientalis (J. Gay) Schroeding – I/b
Delphinium schmalhausenii Alboff subsp. *freynii* (Conrath ex Freyn) Takht. – I/b
Nigella oxypetala Boiss. subsp. *latisecta* (P. Davis) Takht. – I/b

Ranunculaceae
Thalictrum minus L. – III/a

Rosaceae
Agrimonia eupatoria L. – I/a, III/c
Crataegus calycina Peterm. subsp. *curvisepala* (Lindm.) Franco – III/a, III/c
Potentilla recta L. – I/b, III/a
Poterium polygamum Waldst. et Kit. – I/b, III/a
Prunus incana (Pall.) Batsch – III/a

Fabaceae
Alhagi pseudalhagi (Bieb.) Desv. – I/b
Astragalus strictifolius Boiss. – II
Glycyrrhiza glabra L. – I/b
+ *G. glandulifera* Waldst. et Kit. – I/b

Lotus caucasicus Kuprian. ex Juz. – I/b
Medicago sativa L. subsp. *coerulea* (Less. ex Ledeb.) Schmalh. – I
Melilotus officinalis (L.) Pall. – I/a, I/b
Onobrychis transcaucasica Grossh. – I/b
Sophora alopecuroides L. – I/b
Trifolium arvense L. – I/b, II, III/a
T. pratense L. – I/b
T. fragiferum L. subsp. *bonannii* (C. Presl) Soják – I/b

Lythraceae
Lythrum salicaria L. – I/a

Onagraceae
Chamaenerion Stevenii (Boiss.) D. Sosn. – I/a
Epilobium hirsutum L. – I/a, III/a

Aceraceae
Acer monspessulanum L. subsp. *ibericum* (Bieb.) Yaltirik – I/a, I/b III/c

Umbelliferae
Astrodaucus orientalis (L.) Drude – I/b, III/a, III/c
Cachrys ferulacea (L.) Calest. – III/a
Caucalis platycarpos L. – I/b
Daucus carota L. – I/b, III/a
Eryngium billardieri Delar. – II
E. campestre L. – I/b, III/a
Falcaria vulgaris Bernh. – I/b, III/a
Pimpinella nudicaulis Trautv. – III/a
Seseli libanotis (L.) Koch – III/a, III/c
Torilis leptophylla (L.) Reichenb. – III/a
Zosima absinthifolia (Vent.) Link – I/b, III/a

Rubiaceae
Asperula setosa Jaub. et Spach – III/a
Callipeltis cucullaris (L.) DC. – I/b

Valerianaceae
Valeriana leucophaea DC. – III/c

Dipsacaceae
Dipsacus strigosus Willd. ex Roem. et Schult. – III/c
Scabiosa bipinnata C. Koch – III/a
S. argentea L. – I/b, III/a
S. rotata Bieb. – I/b, III/a

Malvaceae
* *Alcea flavovirens* (Boiss. et Buhse) Iljin – I/b
* *Althaea armeniaca* Ten. – I/b
Hibiscus trionum L. – I/b
Lavatera thuringiaca L. – I/a
Malva pusilla Smith – I/b

Peganaceae
Peganum harmala L. – I/b

Zygophyllaceae
Tribulus terrestris L. – I/b, III/a
Zygophyllum fabago L –. I/b

Euphorbiaceae
\+ *Euphorbia orientalis* L. – I/b
E. seguieriana Neck. – I/b, III/a
E. eriophora Boiss. – I/b
* *E. macroclada* Boiss. – III/b

Asclepiadaceae
Cynanchum acutum L. – III/a

Boraginaceae
Anchusa italica Retz. – I/b
Arnebia linearifolia DC. – I/b
Cerinthe minor L. – I/b, II
Echium vulgare L. – I/a, III/a
E. italicum L. – III/a
Heliotropium lasiocarpum Fisch.
Lappula squarrosa (Retz.) Dum. subsp. *heteracantha* (Ledeb.) Chater – I/b
* *Onosma sericeum* Willd. – III/a

Verbenaceae
Verbena officinalis L. – I/b, III/a

Labiatae
Clinopodium vulgare L. – III/a
Eremostachys laciniata (L.) Bunge – I/b, III/a
Leonurus cardiaca L. subsp. *glaucescens* (Bunge) Schmalh. – I/b
* *Marrubium parviflorum* Fisch. et C. A. Mey. – I/b
Mentha longifolia L. – I/a
* *Nepeta erivanensis* Grossh. – I/b
N. mussinii Spreng. – III/a
Origanum vulgare L. – III/a
Phlomis herba-venti L. subsp. *pungens* (Willd.) Maire ex De Fillips – I/b, II, III/a

Salvia verticillata L. – I/b
S. nemorosa L. – I/b
Sideritis montana L. – I/b, III/a
Teucrium polium L. – I/b, III/a
Thymus kotschyanus Boiss. et Hohen. – III/b
Ziziphora persica Bunge – I/b, III/a

Solanaceae
Hyoscyamus niger L. – I/b

Scrophulariaceae
Bungea trifida (Vahl) C. A. Mey. – III/a
Scrophularia rupestris Bieb. ex Willd. – I/b
S. decipiens Boiss. et Kotschy – I/b
S. orientalis L. – III/c
S. variegata Bieb. – I/b
Verbascum blattaria L. – III/a
V. phlomoides L. – I/b
V. laxum Filar. et Ják. – I/b
V. sinuatum L. – I/b

Plantaginaceae
Plantago lanceolata L. – I/b, III/c

Capparidaceae
Capparis spinosa L. – I/b

Cruciferae
Alyssum minus (L.) Rothm. – I/b
Camelina microcarpa Andrz. – I/b
Lepidium draba L. – I/b
L. perfoliatum L. – I/b
L. latifoliatum L. – I/b
L. vesicarium L. – I/b
Sisymbrium loeselii L. – I/b

Resedaceae
Reseda lutea L. – I/b, III/a
Reseda luteola L. – I/b, III/a

Cistaceae
Helianthemum ledifolium (L.) Mill. – III/a

Campanulaceae
* *Michauxia laevigata* Vent. – III/c

Compositae
Achillea tenuifolia Lam. – II
A. nobilis L. subsp. *neilreichii* (A. Kerner) Takht. – I/b
A. biebersteinii Afan. – I/b
A. setacea Waldst. et Kit. – III/a
A. filipendulina Lam. – I/b, III/a
Arctium lappa L. – I/a
Artemisia vulgaris L. – I/b
A. fragrans Willd. – I/b
A. absinthium L. – I/b, III/a
Carduus thoermeri Weinm. subsp. *armenus* (Boiss.) Kazmi – I/b
C. onopordioides Fisch. ex Bieb. – I/b
Carthamus lanatus L. subsp. *turkestanicus* Hanelt – I/b, II
Centaurea behen L. – III/a
C. carduiformis DC. – I/b, III/a
C. squarrosa Willd. – I/b
C. iberica Trev. – I/b
C. depressa Bieb. – I/b
Chondrilla juncea L. subsp. *acantholepis* (Boiss.) Takht. – I/b
Cichorium intybus L. subsp. *glaucum* (Hoffmans. et Link) Tzvel. – I
Cirsium elodes Bieb. – I/b
C. vulgare (Savi) Ten. – I/b
Cnicus benedictus L. – III/a
Conyza canadensis (L.) Cronq. – I/b
Crupina vulgaris Cass. – I/b, III/a
Echinops sphaerocephalus L. – I/b
* *Helichrysum undulatum* Ledeb. subsp. *undulatum* – I/b
* *H. armenium* (Fisch. et C. A. Mey.) DC. – III/a
Inula britannica L. – I/b, III/c
I. helenium L. – III/c
I. auriculata Boiss. et Bal. – I/b
Lactuca serriola Torn. – I/b
Onopordum acanthium L. – I/b
Senecio vernalis Waldst. et Kit. – I/b
S. erucifolius L. subsp. *arenarius* Soó – I/b
\+ *Sonchus oleraceus* L. – I/b
S. arvensis L. – III/c
Stizolophus balsamita (Lam.) Cass. ex Takht. – III/a
Tanacetum parthenifolium (Willd.) Sch. Bip. – I/a, III/a
Tragopogon graminifolius DC. – I/b
Xanthium strumarium L. – I/b
X. spinosum L. – I/b
Xeranthemum longipapposum Fisch. et C. A. Mey. – I/b
X. squarrosum Boiss. – I/b

Caryophyllaceae

Gypsophila bicolor (Freyn et Sint.) Grossh. – I/b

Herniaria hirsuta L. – I/b, III/b

Silene chlorifolia Smith – III/a

Telephium imperati L. subsp. *orientale* (Boiss.) Nyman – III/b

Chenopodiaceae

Atriplex tatarica L. – I/b

Ceratocarpus arenarius L. – I/b

Chenopodium foliosum Aschers. – I/b, III/c

C. botrys L. – I/b

Kochia prostrata (L.) Schrad. – I/b

\+ *Salsola kali* L. – I/b

Amaranthaceae

Amaranthus blitoides S. Wats. – I/b

A. retroflexus L. – I/b

Plumbaginaceae

Limonium meyeri (Boiss.) Kuntze – I/a

Plumbago europaea L. –

Polygonaceae

Atraphaxis spinosa L. – I/a

Polygonum patulum Bieb. – I/b

P. aviculare L. – I/a ,I/b

P. cognatum Meissner – I/b

Rumex tuberosus L. – III/a

Urticaceae

Parietaria diffusa Mert. et Koch – III/c

Ulmaceae

Ulmus carpinifolia Rupp. ex G. Suckow. – I/b, III/a, III/c

Monocotyledonopsida

Juncaceae

Juncus inflexus L. – I/a

Cyperaceae

Carex contigua Hoppe – III/c

Gramineae

Aegilops columnaris Zhuk. – I/b

A. triuncialis L. – I/b

A. cylindrica Host – I/b, III/a

Agropyron elongatum (Host) Beauv. – I/b

A. repens (L.) Beauv. – I/b, III/a

Alopecurus aequalis Sobol. – I/b

Arrhenatherum kotschyi Boiss. – I/b, III/c

Botriochloa ischaemum (L.) Keng – I/b

Bromus tectorum L. – I/b, II, III/a

B. japonicus Thunb. – I/b, III/a

B. squarrosus L. – I/b

\+ *B. inermis* L. – I/b

B. danthoniae Trin. – I/b, III/a

Echinochloa crus-galli (L.) Beauv. – I/a, I/b

Eremopyrum triticeum (Gaertn.) Nevski – I/b, III/a

E. bonaepartis (Spreng.) Nevski – I/b

\+ *Festuca pratensis* Huds. – III/c

Hordeum murinum L. subsp. *glaucum* (Steud.) Tzvel. – I/b

Lolium rigidum Gaudin – I/b

Melica taurica C. Koch – I/b, III/a

Milium vernale Bieb. – III/c

Phleum pratense L. – I/a, I/b

Poa bulbosa L. – I/b, III/a, III/c

Puccinellia gigantea (Grossh.) Grossh. – I/b

Secale vavilovii Grossh. – III/a

\+ *S. segetale* (Zhuk.) Roshev. – III/a

Setaria verticillata (L.) Beauv. – I/b

S. viridis (L.) Beauv. – I/b

Taeniatherum crinitum (Schreb.) Nevski – I/b, II, III/a