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FLORA OF THE BASALT TUFFS IN THE NW SYRIA

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Abstract

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During field examinations of the ecological conditions about the ongoing building of a dam in the republic of Syria in the lower basin of the river Markie, in fall 2002, we came across some basalt tuffs situated on the right shore of the river with an altitude of 300 m. The location of the area N 35° 11", E 36° was 30 km to the north from the city of Tartus and about 10 km from the Mediterranean sea, at the bottom of the Ansari mountain (An-Nusayriyah), Figure 1.

Key words: phrygana, floristic analysis, soil samples

Introduction

The valley of the river is filled with agrophytocenoses and greenhouses for growing tomatoes, *Solanum melongena* L., *Hybiscus esculentus* L. The area is stictly calcareous, with a shallow soil film and a vast percentage of that area is occupied by the following species: *Olea europaea* L., *Citrus sinensis* (L.) Osbeck, *Punica granatum* L., *Ficus carica* L., *Ceratonia siliqua* L., *Phoenix dactylifera* L., *Platanus orientalis* L., *Pyrus syriaca* Boiss., *Myrtus communis* L., *Opuntia ficus-indica* (L.) Mill. The area's climate is Mediterranean with lowest temperature and highest rainfall during winter (December-January) and highest temperatures and lowest rainfall during summer time. January temperature may vary from its lowest 6 - 8°C to a maximum of 15-17°C and July temperature may vary from lowest 20 - 22°C to maximum 43-45°C.

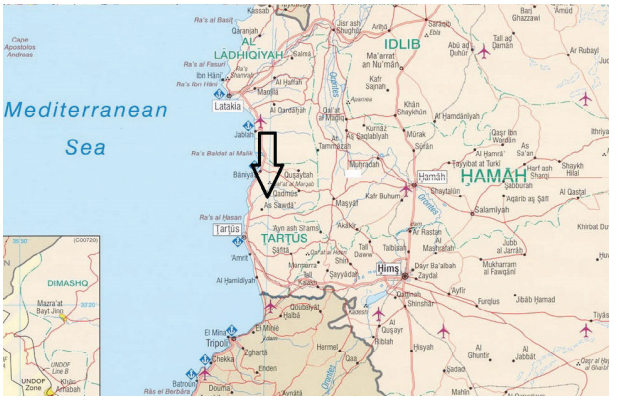

Fig. 1. A map piece pointing out the location of the examined area

Materials and Methods

The collected herbarium materials were determined in accordance to Davis (1966 - 1985), Boissier (1867 - 1888), Mouterdo (1966, 1970, 1983), Thiebant (1936, 1940, 1953) and Tutin (1964 - 1990). The chemical analisys of the soil

Table 1
Chemical analisys of the soil samples from the basalt tuffs

Lab No.	SiO_2 %	Al_2O_3 %	K_2O %	Na_2O %	TiO_2 %	Fe_2O_3 %	CaO %	P_2O_5 %	MnO %	MgO %	Moisture	LOI %
962 1	42.30	16.81	0.23	0.32	1.73	14.94	1.98	0.10	0.36	2.75	8.63	9.47

Lab No.	Pb mg/kg	Cu mg/kg	Zn mg/kg	Cd mg/kg	SO_4 mg/kg	P_2O_5 mg/kg	K_2O mg/kg	pH	Org C %	Humus
962 1	16	103	102	2.4	50	13.08	265.01	6.8	0.465	0.802

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samples taken from the basalt tuffs was conducted in the laboratory "Evrotest Control" ltd. Based on the samples' results (Table 1) the cations with the biggest content are as follow: SiO2 - 42.30%, Al2O3 - 16.81%, Fe2O3 - 14.94%, MgO - 2,75%, CaO - 1.98%, TiO2 - 1.73%, MnO - 0.36%, Na2O - 0.32%, K2O - 0.23%, P2O5 - 0.10%. Heavy metals content showed mostly Cu - 103 mg/kg, Zn - 102, Pb - 16, Cd - 2.4. There were present anions SO_4 – 50%, K_2O - 265.01%, P_2O_5 - 13.08%. The pH of the soil was 6.8 – neutral. Organic carbon was - 0.465%, humus – 0.802%.

Results and Discussions

The investigation rock plant communities find in Coastal Mountains region. The land of the Coastal region is largely made up of limestone. There are ingenuous rocks in specific small areas. Amorphic rock, quartz and marble of continental or marine origin of the fourth geological time are also present in this region.

The local vegetation in this region is represented by phrygana which happens to be typical for the shores and islands of all of the Mediterranean. The phrygana vegetation is referred to with the NATURA Code 5420 Sarcopoterium spinosum phryganae, according to the classification Coryne Biotopes, Pal. Class. 33.3. This whole habitat refers to the alliance Sarcopoterion spinosi Zohary 1947: Sarcopoterietum spinosi Lupino-angustifoli- Lavanduletosum stoechidis. Characteristic species of this alliance are *Sarcopoterium spinosum* (L.) Spach and *Lavandula stoechas* L. (Zohary, 1973).

Syria has a diverse base of vascular flora. About 3459 species belonging to 865 genus and 131 families grow in Syria. Over 50% of Syrian plants are of Mediterranean or Iranian origin (National biodiversity unit (NBU) of Syrian Arab Republic 2000). Out of the floristic analysis it is evident that the biggest groups of biological types are as followes: hemicryptophytes (15 species), followed by a group of annuals (therophytes – 14 species), 5 bushy species and four biannual species (Table 2).

With regards to floristic elements, the predominant species in the examined vegetation are 18 Mediterranean species, followed by Eur-As 4, Med-As 3, Eur-Med 3, Anat. 1 Dianthus inamoenus Schischkin and one Southwest-Asian endemic species *Michauxia campanuloides* L Her. ex Ait.

The area of examination was 30 m x 30 m (a square). According to Braun-Blanquet (1964) skale abundant and acceptation, the vegetation on the tuffs was comprised of open communities of *Sarcopoterium spinosum* with coverage of 50%. 40 vascular plant species was established. Grasses – 7,

Table 2
Chasmophytic community of alliance Sarcopoterion spinosi Sohary 1947

Name of species	Abundance/ Dominance	Life form	Floristic element
Grass species:			
Hipparrenia hirta (L.) Stapf.	3	H	Med
Oryzopsis miliaceum(L.) Cosson	1	H	Eur-As
Trachynia distachya (L.) Link	1	Th	Med-As
Dactylis glomerata L.	2	H	Eur-As
Desmazeria rigida (L.) Tutin	1	Th	Sub-Med
Achnatherum calamagrostis (L.) P. Beauv.	2	H	Sub-Med
Avena sterilis L.	r	Th	Eur-As
Leguminous:			
Trifolium resupinatum L.	1	Th	Med
T. stellatum L.	1	Th	Med
T. tomentosum L.	1	Th	Med
Trigonella monspeliaca L.	r	Th	Sub-Med
Medicago turbinata (L.) All.	r	Th	Med
Anthyllis tetraphylla L.	r	Th	Med
Alhagi maurorum Medik.	1	Ph	Med-As
Onobrychis caput-galli (L.) Lam.	1	Th	Sub-Med

Table 2
continued

Herb diversity			
Sisymbrium orientale L.	r	Th-H	Eur-As
Echium humile Desf.	2	H	Med
Paronychia argentea Lam.	2	H	Med
Crucianella angustifolia L.	r	Th	Med
Verbascum sinuatum L.	1	Th-H	Med
Carthamus tenuis (Boiss.& Blanche) Bornm.	1	Th	Med
Papaver argemone L.	1	Th	Eur-Med
Carlina sp.	r	Th	-
Centaurea calcitrapa L.	2	Th-H	Med
Dittrichia viscosa (L.) Greuter	1	H	Sub-Med
Dianthus inamoenus Schischkin	2	H	Anat
Teucrium polium L.	1	H	Pont-Med
Linum mucronatum Bertol. subsp.*orientale* (Boiss.) Davis	r	H	Med
Michauxia campanuloides L,Her. ex Ait.	r	H	SW As
Allium cassium Boiss.	r	H	Med
Crepis setosa Haller f.	1	Th	Eur-Med
Torilis arvensis (Hudson) Link	+	Th	Eur-Med
Micromeria myrtifolia Boiss.et Hoehm	+	H	Med
Paronychia alba	1	H	Med
Capparis spinosa L.	+	Ph	Med-C As
Carduus sp.	+	H	-
Carlina curetum Heldr.ex Halacsy	1	Th-H	Med
Bushes:			
Pistacia terebinthus L.	+	Ph	Pont-Med
Lavandula stoechas L.	1	Ph	Med
Sarcopoterium spinosum (L.) Spach	2	Ph	Med

Leguminous – 8, Herb diversity – 22 and Bushes – 3. The content of the chasmophytic comunity was as follows:

When a comparison is made between the flora of the basalt tuffs with the flora of the same alliance Sarcopoterion spinosi Sohary 1947 (near the town of Gure in North West Turkey), which is located 504 km north from the locality in Syria and based on limestone rocks, it was established that the common species for the two floras are as follow: *Anthyllis tetraphylla* L., *Hipparrhenia hirta* (L.) Stapf., *Dactylis glomerata* L., *Crucianella angustifolia* L., *Sarcopoterium spinosum* (L.) Spach and *Micromeria myrtifolia* Boiss. et Hohem. The rest of the species that comprise the community in the town of Gure, cannot be found in the Syrian one and these are: *Pinus halepensis* Miller, *Quercus coccifera* L., *Olea europaea* L., *Clematis cirrhosa* L., *Jasminum fruticans* L., *Vitex agnus-castus* L., *Asparagus acutifolius* L., *Bituminaria bituminosa* (L.) Stirt., *Cistus creticus* L., *Achnatherum bromoides* (L.) Beauv., *Phleum subulatum* (Savi) Asch. & Graebn., *Pallenis spinosa* (L.) Cass., *Dasypyrum vilosum* (L.) Cand., *Ruscus aculeatus* L. and *Ceterach officinarum* DC.

Conclusion

There are chemical analyses of the soil samples taken from the basalt tuffs in NW Syria. Presence of the heavy

metal ions Pb++, Cu++, Zn++, Cd++ are reason for the development of characteristic flora, distinguished of some other associations of alliance Sarcopoterion spinosi Zohary 1947 of the East Mediterranean region. There are established SW Asian endemic – *Michauxia campanuloides* L'Her. ex Ait. in this vegetation. Make a floristic analysis of the biological type and floristic elements of this vegetation. There is a comparison between the floras of the basalt tuffs with the flora of the same alliance Sarcopoterion spinosi Zohary 1947 near the town of Gore in North West Turkey.

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