

ENDEMIC PLANT SPECIES AND THEIR THREATENED CATEGORIES VEGETATED IN THE BOUNDARY OF AFYONKARAHISAR PROVINCE IN TURKEY

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ABSTRACT

During the floristic investigations carried out in the province of Afyonkarahisar, approximately 2000 vegetated different plant species and subspecies were determined. 330 of these plant species were confirmed as endemic to Turkey (325 taxa) and only to Afyonkarahisar (5 taxa). Plant families containing most of these endemic plant species are: **Asteraceae** (44 taxa), **Fabaceae** (42 taxa), **Lamiaceae** (39 taxa), **Scrophulariaceae** (37 taxa) and **Caryophyllaceae** (24 taxa). *Verbascum* (28 species) and *Astragalus* (22 species) are the most endemic species containing plant genera. 329 endemic taxa were evaluated according to IUCN risk categories as rare (lower risk, LR), threatened (vulnerable, VU; data deficient, DD) or endangered (critically endangered, CR; endangered, EN) and the number of plant taxons in these IUCN categories are as follows; 1 for DD, 2 for CR, 14 for EN, 32 for VU and 281 for LR.

Keywords: Endemic, Afyonkarahisar, Turkey, IUCN Categorization

AFYONKARAHİSAR SINIRLARINDA YAYILIŞ GÖSTEREN ENDEMİK BİTKİLER VE TEHLİKE KATEGORİLERİ

ÖZET

Afyonkarahisar ili sınırlarında yapılan floristik çalışmalar süresince, yaklaşık 2 000 farklı bitki türü ve alttürünün yayılış gösterdiği belirlendi. Bu bitki türlerinden 330'nun Türkiye'ye (325 takson) ve Afyonkarahisar'a (5 takson) endemik olduğu tespit edildi. Bu endemik bitki türlerinin büyük çoğunluğunu içeren bitki familyaları; **Asteraceae** (44 takson), **Fabaceae** (42 takson), **Lamiaceae** (39 takson), **Scrophulariaceae** (37 takson) ve **Caryophyllaceae** (24 takson)'dır. *Verbascum* (28 tür) ve *Astragalus* (22 tür) en fazla endemik tür bulunduran bitki genuslarıdır. 329 endemik bitki nadir (düşük risk, LR), tehlikede (zarar görebilir, VU; veri yetersiz, DD) ve tehlike altında (kritik risk altında CR; tehlike altında, EN) şeklindeki IUCN kategorilerine göre

değerlendirilmiştir ve bu IUCN kategorilerine giren bitki takson sayıları şu şekildedir; 1'i DD, 2'si CR, 14'ü EN, 32'si VU ve 281'i LR.

Keywords: Endemik, Afyonkarahisar, Türkiye, IUCN kategorilendirmesi

1. INTRODUCTION

Phytogeographically Afyonkarahisar is essentially situated at the merging point of Irano-Turanian and Mediterranean floristic areas. However, because of the mountain range situated on the borders of Afyonkarahisar, the region has local climate conditions which facilitate the sheltering of plants particular to the Euro-Siberian flora region which is the third floristic region in our country. In addition Afyonkarahisar hosts topographical characteristics and different habitats which facilitate the enrichment of the vegetation. The enriched vegetation is especially noticeable in Sultandağları, Akdağ and Emirdağ. That is why numerous local and foreign botanists have collected plant specimens from the afore mentioned mountains and different parts of Afyonkarahisar at various times. Among such botanists Bornmüller, St.-Lager, Balls, Reese, Wall, Heilbronn, Başarman, Huber-Morath, Birand, Zohary, Karamanoğlu, Baytop, Yaltrık, Sorger, Kotte, Coode, Jones, Dudley, Romieux, Bilger, Krause, Buttler can be mentioned [1, 2]. Detailed flora and vegetation studies started in the mid 1970's and are still continuing. In Sultandağları, Baytop and Dökmeci [3]; in Akdağ, Gemici [4]; in Bayat-Köroğlubeli, Vural [5]; Afyon Başkomutan Tarihi Milli Parkı (Commander-in-Chief Historical National Part) Ekim et al. [6]; in Maymundağları, Aytaç [7]; in Ayazini (Ihsaniye) environs Aşçı [8]; in other parts of Ahırdağı, Sultan Mountains and Afyonkarahisar, Kargioğlu [9-11]; in Akşehir Gölü lake region, Küçüködük [12]; in Kumalar Mountain, Akçiçek [13]; in Emirdağ, Köse [14] and Kurt [15] carried out detailed studies on flora and vegetation. In addition Seçmen and Leblebici [16] carried out studies on the vegetation of areas such as Eber Lake, Çapalı Lake, Acı Lake and Swamp, Heybeli Springs which are within the borders of Afyonkarahisar province (Figure).

2. MATERIAL AND METHOD

The research material consisted of specimens of flora and vegetation collected by us which had been determined to be endemic as a result of previous studies carried out in this region. Turkey Flora [1, 2, 17] volumes were utilized in the identification of the specimens. Threatened categories are proposed for endemic taxa according to IUCN risk categories [18]. The endemic plant list is given in alphabetical order.

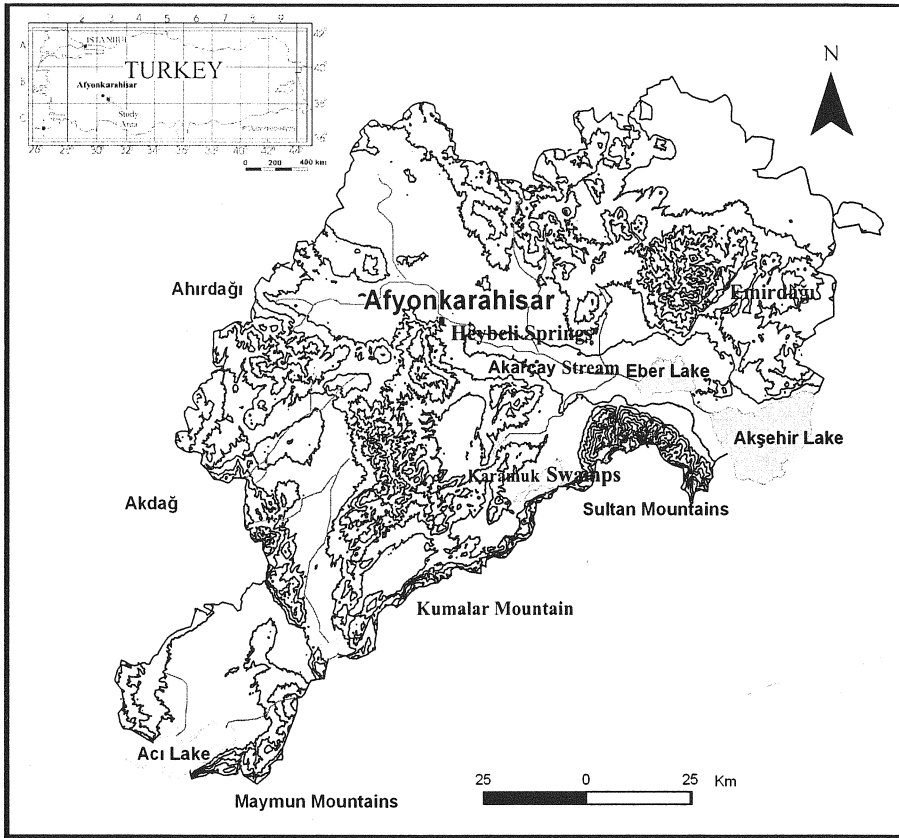


Figure. Topographical map of Afyonkarahisar province.

3. BULGULAR

ANGIOSPERMAE

DICOTYLEDONES

ACANTHACEAE

Acanthus hirsutus Boiss.**Endemic. LR(lc)**

ACERACEAE

Acer hyrcanum Fisch. & C.A.
Meyer subsp. *keckianum* (Pax)
Yalt. Endemic. **LR(cd)***A. hyrcanum* Fisch. & C.A. Meyer
subsp. *sphaerocaryum* Yalt.**Endemic. E. Medit. element.**

VU

APIACEAE

Bupleurum heldreichii Boiss. &
Bal. Endemic. Ir.-Tur. element.
LR(lc)*B.turcicum* Snogerup
Endemic. Ir.-Tur. element.
LR(nt)*Ferulago aucheri* Boiss.
Endemic. **LR(lc)***F. macrosiadia* Boiss.& Bal.
Endemic. E. Medit. element.**LR(lc)***F. platycarpa* Boiss. & Bal.
Endemic. Ir.-Tur. element. **LR(lc)***Heracleum platytaenium* Boiss.Endemic. **LR (lc)***Peucedanum chryseum* (Boiss. &
Heldr.) Chamb.
Endemic. **LR(lc)**

ASCLEPIADACEAE

Vincetoxicum canescens (Willd.)
Decne. subsp. *pedunculata* Browicz
Endemic. E. Medit.element. **VU***V. fuscatum* (Hornem.) Reichb. fil.
subsp. *boissieri* (Kusn.) Browicz
Endemic. Ir.-Tur. element. **LR(lc)**

ASTERACEAE

(COMPOSITAE)

Achillea phrygia Boiss. & Bal.
Endemic. Ir.-Tur. element. **LR(lc)***A. monocephala* Boiss. & Bal.
Endemic. Ir.-Tur. element. **EN***A. teretifolia* Willd.
Endemic. Ir.-Tur. element. **LR(lc)***Anthemis aciphylla* Boiss. var.
aciphylla
Endemic. E. Medit. element.**LR(lc)**

A. aciphylla Boiss. var. *discoidea*
Boiss. Endemic. E. Medit.
element. **LR(lc)**

A. fulvida Grierson
Endemic. Ir.-Tur. element. **DD**

A. wallii Hub.-Mor. & Reese

Endemic. Ir.-Tur. element.
LR(cd)

A. wiedemanniana Fisch. & Mey.
Endemic. **LR(lc)**

Carduus nutans L. subsp. *falcato-*
incurvus P.H.Davis

Endemic. LR(cd)

C. olympicus Boiss. subsp.
hypoleucus (Bornm.) P.H.Davis
Endemic. Ir.-Tur. element. **LR(lc)**

Centaurea aphrodisia Boiss.
Endemic. E. Medit. element. **VU**

C. calolepis Boiss.
Endemic. E. Medit. element.

LR(lc)

C. inexpectata Wagenitz
Endemic. Euro-Sib. element.

LR(lc)

C. mathiolifolia Boiss.

Endemic. Ir.-Tur. element. VU

C. olympica C.Koch
Endemic. **LR(lc)**

C. polyclada DC.
Endemic. E. Medit. element. **VU**

C. reuterana Boiss. subsp.
phrygia Bornm.
Endemic. E. Medit. element.

LR(lc)

C. reuterana Boiss. var. *reuterana*
Endemic. **LR(lc)**

Cicerbita variabilis (Bornm.)
Bornm. Endemic. **LR(lc)**

Cirsium alatum (Gmelin) Bobrov
subsp. *pseudoreticum* P.H.Davis
& Parris.
Endemic. Ir.-Tur. element. **LR(lc)**

C. leucopsis DC.
Endemic. E. Medit. element.

LR(lc)

C. libanoticum DC.
subsp. *lycaonicum* (Boiss. &
Heldr.) P.H.Davis & Parris
Endemic. E. Medit. element.
LR(lc)

C. sintenisii Freyn
Endemic. **LR(nt)**

C. sipyleum O.Schwarz

Endemic. E. Medit. element.

LR(nt)

Cousinia birandiana Hub.-Mor.
Endemic. Ir.-Tur. element. **LR**

(lc)

Crepis macropus Boiss. & Heldr.
Endemic. Ir.-Tur. element. **LR(lc)**

Helichrysum arenarium (L.)
Moench subsp. *aucheri* (Boiss.)
Davis & Kupicha
Endemic. Ir.-Tur. element. **LR**

(lc)

H. chionophilum Boiss. & Bal.
Endemic. **LR(lc)**

H. compactum Boiss.
Endemic. E. Medit. element. **EN**

Hieracium lasiochaetum
(Bornm. et Zahn) Sell & West
Endemic. **LR(lc)**

H. paphlagonicum Freyn & Sint.
Endemic. **LR(lc)**

Inula anatolica Boiss.
Endemic. **LR(lc)**

Jurinea pontica Hausskn. &
Freyn ex Hausskn.

Endemic. Ir.-Tur. element. **LR(lc)**

Onopordum anatolicum (Boiss.)
Eig
Endemic. Ir.-Tur. element. **LR(lc)**

Pilosella hoppeana (Schultes)
C.H. & F.W.Schultz
subsp. *lydia* (Bornm.et Zahn) Sell
& West Endemic. **LR(lc)**

Ptilostemon afer (Jacq.) Greuter
subsp. *eburneus* Greuter

Endemic. **LR(lc)**

Scorzonera eriophora DC.
Endemic. **LR(lc)**

S. semicana DC.
Endemic. Iran.-Turan element.
LR(lc)

S. tomentosa L.
Endemic. Ir.-Tur. element. **LR(lc)**

Senecio castagneanus DC.
Endemic. E. Medit. element.
LR(lc)

Tanacetum argenteum (Lam.)
Willd. subsp. *argenteum*
Endemic. Ir.-Tur. element. **LR(lc)**

T. cadmeum (Boiss.) Heywood
subsp. *orientale* Grierson

Endemic. Ir.-Tur. element.
LR(lc)

Tragopogon aureus Boiss.
Endemic. **LR(lc)**

Endemic. Ir.-Tur. element.
LR(lc)

Tripleurospermum callosum
(Boiss. & Heldr.) E. Hossain
Endemic. **LR(lc)**

***Nonea macrosperma* Boiss. & Heldr.**
Endemic. Ir.-Tur. element. **LR(lc)**

BORAGINACEAE

Alkanna areolata* Boiss. var. *areolata

Onosma armenum DC.
Endemic. **LR(lc)**

Endemic. E. Medit. element.
LR(lc)

O. bracteosum Hausskn. & Bornm.
Endemic. Ir.-Tur. element. **LR(lc)**

A. pseudotinctoria Hausskn. ex
Hub.-Mor.
Endemic. Ir.-Tur. element. **LR(lc)**

Paracaryum aucheri (A. DC.)
Boiss. Endemic. E. Medit.
element. **LR(cd)**

A. tinctoria (L.) Tausch subsp.
glandulosa Hub.-Mor.
Endemic. E. Medit. element.
LR(cd)

P. calycinum Boiss. & Bal.
Endemic. Ir.-Tur. element.
LR(lc)

A. tubulosa Boiss.
Endemic. E. Medit. element.
LR(lc)

BRASSICACEAE
Alyssum argyrophyllum Schott &
Kotschy Endemic. **LR(nt)**

Anchusa leptophylla Roem. &
Schult. subsp. *incana* (Ledeb.)
Champ.
Endemic. Ir.-Tur. element. **LR(lc)**

A. aurantiacum Boiss.
Endemic. E. Medit. element.
LR(cd)

Echium orientale L.
Endemic. **LR(lc)**

A. blepharocarpum Dudley &
Hub.-Mor. Endemic. Ir.-Tur.
element. **LR(nt)**

Moltkia aurea Boiss.

A. huetii Boiss.

Endemic. Ir.-Tur. element.

LR(lc)

A. pateri Nyar. subsp. *pateri***Endemic. Ir.-Tur. element.**

LR(lc)

A. thymops (Hub.-Mor. & Reese)
Dudley Endemic. Ir.-Tur. element.
LR(cd)*Aubrieta canescens* (Boiss.)
Bornm. subsp. *canescens*
Endemic. **LR(lc)***A. pinardii* Boiss.
Endemic. Ir.-Tur. element. **LR(lc)***Barbarea trichopoda* Hausskn. ex
Bornm.
Endemic. **LR(nt)***Boreava aptera* Boiss. & Heldr.**Endemic. Ir.-Tur. element. VU***Draba bruniifolia* Stev.
subsp. *heterocoma* (Fenzl) Coode
& Cullen var. *nana* (Stapf) Schulz
Endemic. **LR(lc)***Erysimum kotschyianum* Gay
Endemic. **LR(lc)***E. lycaonicum* (Hand.-Mazz.)
Hub.-Mor.
Endemic. Ir.-Tur. element. **LR(lc)***E. pallidum* Boiss.
Endemic. **EN***Thlaspi violascens* Boiss.
Endemic. **LR(lc)**

CAMPANULACEAE

Asyneuma compactum (Boiss. &
Heldr.) Damboldt
Endemic. E. Medit. element.**LR(nt)***A. limonifolium* (L.) Janchen
subsp. *pestalozzae* (Boiss.)
Damboldt
Endemic. **LR(lc)***A. linifolium* (Boiss. & Heldr.)
Bornm. subsp. *linifolium*
Endemic. E. Medit. element.**LR(lc)***Campanula argaea* Boiss. & Bal.**Endemic. Ir.-Tur. element.**

LR(lc)

C. iconia PhitosEndemic. Ir.-Tur. element. **EN***C. lyrata* Lam. subsp. *lyrata*
Endemic. **LR(lc)***C. sorgerae* Phitos
Endemic. **CR**

CAPRIFOLIACEAE

Lonicera caucasica Pallas

subsp. *orientalis* (Lam.) Chamb.
& Long Endemic. **LR(lc)**

CARYOPHYLLACEAE

Arenaria acerosa Boiss.
Endemic. **LR(lc)**

A. ledebouriana Fenzl var.
pauciflora McNeill
Endemic. **LR(lc)**

Bolanthus cherlerioides (Bornm.)
Barkoudah Endemic. E. Medit.
element. **LR(cd)**

B. minuartioides (Jaub. & Spach)
Hub.-Mor.
Endemic. **LR(lc)**

B. spergulifolius (Jaub. & Spach)
Hub.-Mor. Endemic. **VU**

Dianthus anatolicus Boiss.
Endemic. **LR(lc)**

D. balansae Boiss.
Endemic. **LR(lc)**

D. erinaceus Boiss. var. *alpinus*
Boiss. Endemic. **VU**

D. leucophaeus Sibth. & Sm. var.
leucophaeus
Endemic. **LR(lc)**

D. lydus Boiss.
Endemic. **LR(lc)**

Gypsophila parva Barkoudah

Endemic. Ir.-Tur. element. **LR(lc)**

G. tubulosa (Jaub. & Spach)
Boiss. Endemic. E. Medit.
element. **LR(lc)**

G. eriocalyx Boiss.
Endemic. Ir.-Tur. element. **LR(lc)**

Minuartia anatolica (Boiss.)
Woron. var. *anatolica*
Endemic. **LR(lc)**

M. anatolica (Boiss.) Woron. var.
arachnoidea McNeill
Endemic. Ir.-Tur. element. **LR(lc)**

M. anatolica (Boiss.) Woron. var.
Phrygia (Bornm.) McNeill
Endemic. Ir.-Tur. element. **VU**

M. leucocephaloides (Bornm.)
Bornm. Endemic. **LR(lc)**

M. mesogitana (Boiss.) Hand.-
Mazz. subsp. *lydia* (Boiss.)
McNeill Endemic. E. Medit.
element. **LR(cd)**

M. umbellulifera (Boiss.) McNeill
subsp. *salbacica* McNeill
Endemic. **EN**

Saponaria chlorifolia Kunze
Endemic. **LR(lc)**

S. kotschyi Boiss.
Endemic. **LR(lc)**

S. caryophylloides (Poiret) Oth
subsp. *echinus* (Boiss. & Heldr)
Coode et Cullen
Endemic. **LR(nt)**

S. sipylea O. Schwarz
Endemic. E. Medit. element. **VU**

Velezia hispida Boiss.
Endemic. **LR(lc)**

CISTACEAE

Fumana paphlagonica Bornm. &
Janchen

Endemic. Ir.-Tur. element.
LR(lc)

Helianthemum nummularium (L.)
Miller. subsp. *lycaonicum* Coode
& Cullen Endemic. **LR(lc)**

CONVOLVULACEAE

Convolvulus assyricus Griseb.
Endemic. Ir.-Tur. element. **LR(lc)**

C. galaticus Bostan ex Choisy
Endemic. Ir.-Tur. element. **LR(lc)**

C. pulvinatus Sa'ad
Endemic. Ir.-Tur. element.
LR(nt)

CRASSULACEAE

Sedum lydium Boiss.
Endemic. E. Medit. element.
LR(lc)

DIPSACACEAE

Pterocephalus pinardii Boiss.
Endemic. E. Medit. element.

LR(lc)

Scabiosa hololeuca Bornm.

Endemic. Ir.-Tur. element. EN

EUPHORBIACEAE

Euphorbia anacampseros Boiss.
var. *anacampseros*
Endemic. **LR(lc)**

E. falcata L. subsp. *macrostegia*
(Bornm.) O. Schwarz
Endemic. E. Medit. element.

LR(lc)

FABACEAE

(LEGUMINOSAE)
Astragalus acicularis Bunge

Endemic. Ir.-Tur. element.
LR(lc)

A. acmonotrichus Fenzl
Endemic. E. Medit. element.

LR(lc)

A. akscheherensis Freyn &
Bornm.

Endemic. Ir.-Tur. element. VU

A. baibutensis Bunge

Endemic. Ir.-Tur. element.

LR(lc)

A. campylosema Boiss. subsp.
atropurpureus (Boiss.) Chamb.
Endemic. **LR(lc)**

A. coodei D. F. Chamb.& V. A.
Matthews Endemic. **LR(lc)**

A. condensatus Ledeb.

Endemic. Ir.-Tur. element.

LR(lc)

A. flavescens Boiss.
Endemic. E. Medit. element.

LR(nt)

A. gaeobotrys Boiss. & Bal.
Endemic. **EN**

A. gymnolobus Fisch.
Endemic. Ir.-Tur. element. **LR(lc)**

A. lycius Boiss.
Endemic. **LR(lc)**

A. lydius Boiss.

Endemic.Ir.-Tur. element.

LR(lc)

A. melanophrurius Boiss
Endemic. Ir.-Tur. element.

LR(nt)

A. mesogitanus Boiss.

Endemic. **LR(lc)**

A. micropterus Fischer
Endemic. Ir.-Tur. element. **LR**
(lc)

A. pinetorum Boiss.

Endemic. Ir.-Tur. element.

LR(lc)

A. pisidicus Boiss. & Heldr.

Endemic. Ir.-Tur. element.

LR(lc)

A. sibthorpianus Boiss.

Endemic. **LR(lc)**

A. strictispinis Boiss.

Endemic. **LR(nt)**

A. stereocalyx Bornm.

Endemic. Ir.-Tur. element.

LR(cd)

A. tmoleus Boiss. var.
bounacanthus (Boiss.) D. F.
Chamb. Endemic. **LR(nt)**

A. vulnerariae DC.

Endemic. **LR(lc)**

Colutea melanocalyx Boiss. &
Heldr. subsp. *davisiana* (Browicz)
Chamb.
Endemic. E. Medit. element. **LR(lc)**

C. melanocalyx Boiss. & Heldr.
subsp. *melanocalyx*

Endemic. Medit. element. **EN**

Cytisopsis dorycniifolia Jaub. &
Spach subsp. *reeseana* (Guyot)
Hub.-Mor. Endemic. E. Medit.
element. **LR(nt)**

Ebenus hirsuta Jaub. & Spach
Endemic. Ir.-Tur. element. **LR(lc)**
Genista aucheri Boiss.

Endemic. Ir.-Tur. element.
LR(lc)

G. burdurensis P. Gibbs

Endemic. Ir.-Tur. element.
LR(cd)

G. involucrata Spach

Endemic. Ir.-Tur. element.
LR(lc)

Hedysarum cappadocicum Boiss.
Endemic. Ir.-Tur. element.
LR(lc)

H. pestalozzae Boiss.

Endemic. Ir.-Tur. element.
LR(lc)

Lathyrus brachypterus Celak. var.
brachypterus
Endemic. Ir.-Tur. element. **LR(lc)**

L. czeczottianus Bassler
Endemic. **LR(lc)**

L. tukhtensis Czezc.
Endemic. **LR(lc)**

Melilotus bicolor Boiss. & Bal.
Endemic. Ir.-Tur. element. **LR(lc)**

Onobrychis armena Boiss. &
Huet Endemic. **LR(lc)**

O. pisidica Boiss.

Endemic. Ir.-Tur. element.
LR(nt)

Sphaerophysa kotschyana Boiss.

Endemic. Ir.-Tur. element.
LR(cd)

Thermopsis turcica Kit Tan,
Vural & Küçüködük
Endemic. E. Medit. element. **CR**

Trifolium caudatum Boiss.
Endemic. **LR(lc)**

T. pannonicum Jacq. subsp.
elongatum (Willd.) Zoh.
Endemic. **LR(lc)**

Trigonella cretica (L.) Boiss.
Endemic. E. Medit. element.

LR(nt)

FAGACEAE

Quercus vulcanica (Boiss. &
Heldr. ex) Kotschy

Endemic. E. Medit. element.

LR(nt)

H. heterophyllum Vent.

Endemic. **LR(lc)**

GERANIACEAE

Erodium amanum Boiss. &
Kotschy Endemic. **LR(lc)**

H. kotschyanum Boiss.

Endemic. **LR (nt)**

Geranium cinerium Cav.
subsp. *subcaulescens* (L' Hér. ex
DC.) Hayek var. *subacutum* (Boiss.)
P.H. Davis & Roberts
Endemic. Ir.-Tur. element. **LR(lc)**

ILLECEBRACEAE

Paronychia angorensis Chaudhri

Endemic. Ir.-Tur. element. **VU**

Paronychia carica Chaudhri

Endemic. **VU**

GUTTIFERAE

Hypericum adenotrichum Spach
Endemic. **LR(lc)**

P. dudleyi Chaudhri

Endemic. Ir.-Tur. element. LR
(cd)

H. aviculariifolium Jaub. & Spach
subsp. *aviculariifolium* var.
aviculariifolium
Endemic. E. Medit. element.

LR(lc)

LAMIACEAE(LABIATAE)

Ajuga bombycina Boiss.

Endemic. E. Medit. element.

LR(nt)

H. aviculariifolium Jaub. & Spach
subsp. *byzantinum* (Azn.) Robson
Endemic. E. Medit. element.

LR(cd)

Ballota nigra L. subsp. *anatolica*

P.H. Davis

Endemic. Ir.-Tur. element.

LR(lc)

H. aviculariifolium Jaub. & Spach
subsp. *depilatum* (Freyn &
Bornm.) Rabson var. *depilatum*
Endemic. Ir.-Tur. element. **LR(lc)**

Lamium eriocephalum Bentham

subsp. *glandulosidens* (Hub.-
Mor.)R.Mill Endemic. E. Medit.
element. **LR(nt)**

Subsp. *depilatum* (Freyn &
Bornm.) N. Robson
var. *bourgaei* (Boiss.) N. Robson
Endemic. **LR(lc)**

Marrubium astracanicum Jacq.
subsp. *macrodon* (Bornm.)
P.H.Davis
Endemic. **LR(lc)**

M. globosum Montbret & Aucher
ex Bentham subsp. *globosum*

Endemic. Ir.-Tur. element.
LR(lc)

M. trachyticum Boiss.

Endemic. Ir.-Tur. element.
LR(nt)

Micromeria cristata (Hampe)
Gris. subsp. *carminea* (P.H.Davis)
P.H. Davis
Endemic. E. Medit. element. **VU**

M. cristata (Hampe)Gris. subsp.
phrygia P.H. Davis
Endemic. E. Medit. element.

LR(lc)

Nepeta viscida Boiss.
Endemic. E. Medit. element.

LR(nt)

Origanum sipyleum L.
Endemic. E. Medit. element.

LR(lc)

Phlomis armeniaca Willd.
Endemic. Ir.-Tur. element. **LR(lc)**

P. grandiflora H. S. Thomps.
var. *fimbrilligera* (Hub.-Mor.)
Hub.-Mor.
Endemic. E.Medit. element. **VU**

P. linearis Boiss.& Bal.
Endemic. Ir.-Tur. element. **LR(lc)**

P. nissolii L.
Endemic. Ir.-Tur. element. **LR(lc)**

Salvia cadmica Boiss.
Endemic. **LR(lc)**

S. cedronella Boiss.
Endemic. E. Medit. element. **VU**

S. cryptantha Montbret & Aucher
ex Bentham

Endemic. Ir.-Tur. element.
LR(lc)

S. cyanescens Boiss. & Bal.

Endemic. Ir.-Tur. element.
LR(lc)

S. dichroantha Stapf.

Endemic. Ir.-Tur. element.
LR(lc)

S. pisidica Boiss. & Heldr. ex
Bentham

Endemic. Ir.-Tur. element.
LR(lc)

Satureja wiedemanniana
(Lallem.) Velen.

Endemic. **LR(lc)**

Sideritis akmanii Z. Aytaç, M.
Ekici & A. Dönmez
Endemic. **VU**

S. condensata Boiss. & Heldr.
Endemic. E. Medit. element.

LR(cd)

S. dichotoma Huter
Endemic. **LR(lc)**

S. galatica Bornm.
Endemic. **LR(nt)**

S. leptoclada O. Schwarz &
P.H.Davis Endemic. E. Medit.
element. **LR(cd)**

S. libanotica Labill. subsp.

linearis (Benth.) Bornm.

Endemic. E. Medit. element. **LR(lc)**

Scutellaria orientalis L. subsp.
pectinata (Benth.) J. R. Edm.
Endemic. Ir.-Tur. element. **LR(lc)**

Stachys cretica L. subsp.
anotolica Rech. fil.

Endemic. Ir.-Tur. element.
LR(lc)

S. cretica L. subsp. *smyrnaea*
Rech. fil. Endemic. E. Medit.
element. **LR(lc)**

S. iberica Bieb. subsp. *iberica* var.
densipilosa Bhattacharjee

Endemic. Ir.-Tur. element.
LR(lc)

S. tmolea Boiss.
Endemic. E. Medit. element.

LR(lc)

Teucrium chamaedrys L. subsp.
tauricum Rech. fil
Endemic. E. Medit. element.

LR(lc)

***Thymus leucostomus* Hausskn.
& Velen. var. *leucostomus***

Endemic. LR(nt)

T. longicaulis C. Presl
subsp. *chaubardii* (Boiss. &
Heldr. ex Reichb. fil.) Jalas
var. *antalyanus* (Klokov) Jalas
Endemic. **LR(nt)**

T. sipyleus Boiss. subsp. *sipyleus*
var. *sipyleus*
Endemic. **LR(lc)**

T. zygioides Griseb. var.
lycaonicus (Celak.) Ronniger
Endemic. E. Medit. element.

LR(lc)

Wiedemannia orientalis Fisch. &
Mey.

Endemic. Ir.-Tur. element.
LR(lc)

Ziziphora taurica M. Bieb.
subsp. *cleonioides* (Boiss.) P.H.
Davis Endemic. E. Medit.
element. **LR (cd)**

LINACEAE

Linum cariense Boiss.

Endemic. Ir.-Tur. element.
LR(lc)

L. hirsutum L. subsp. *anatolicum*
(Boiss.) Hayek var. *anatolicum*

Endemic. Ir.-Tur. element.
LR(lc)

L. hirsutum L. subsp.
pseudoanatolicum P.H. Davis

Endemic. Ir.-Tur. element.
LR(lc)

MALVACEAE

Alcea apterocarpa (Fenzl) Boiss.
Endemic. Ir.-Tur. element. **LR(lc)**

PAPAVERACEAE

Glaucium acutidentatum Hausskn. &
Bornm.

Endemic. Ir.-Tur. element. **LR(lc)**

Glaucium grandiflorum Boiss. &
Huet var. *torquatum* Cullen

Endemic. Ir.-Tur. element. EN

Papaver apokrinomenon Fedde
Endemic. **LR(lc)**

P. spicatum Boiss. & Bal. var.
spicatum
Endemic. **LR(lc)**

P. virchowii Aschers & Sint ex
Boiss.
Endemic. **LR(cd)**

PLUMBAGINACEAE

Acantholimon acerosum (Willd.)
Boiss. var. *brachystachyum* Boiss.

Endemic. Ir.-Tur. element.
LR(lc)

***A. caesareum* Boiss. & Bal.**

Endemic. Ir.-Tur. element. LR(lc)

***A. puberulum* Boiss. & Bal. var.
longiscapum Bokhari**

Endemic. VU

Limonium iconicum (Boiss. & Heldr.) O. Kuntze

Endemic. Ir.-Tur. element.
LR(lc)

L. lilacinum (Boiss. & Bal.) Wag.

Endemic. Ir.-Tur. element.
LR(lc)

POLYGONACEAE

Polygonum afyonicum Leblebici & Gemici

Endemic. Ir.-Tur. element. EN

P. salebrosum Coode & Cullen
Endemic. **LR(cd)**

Rumex gracilescens Rech.
Endemic. **LR(nt)**

PRIMULACEAE

Cyclamen cilicium Boiss. & Heldr. var. *intaminatum* Meikle
Endemic. E. Medit. element. **VU**

RANUNCULACEAE

Consolida aconiti (L.) Lindney
Endemic. **LR(lc)**

C. raveyi (Boiss.) Schrödinger
Endemic. Ir.-Tur. element. **LR(lc)**

Delphinium fissum Waldst. & Kit subsp. *anatolicum* Chowdhuri & Davis
Endemic. **LR(lc)**

Ranunculus demissus DC. var. *major* Boiss.
Endemic. **LR(lc)**

R. heterorhizus Boiss. & Bal.
Endemic. **LR(cd)**

R. reuterianus Boiss.
Endemic. **LR(lc)**

RHAMNACEAE

Rhamnus petiolaris Boiss.
Endemic. **LR(lc)**

R. thymifolius Bornm.
Endemic. **LR(lc)**

ROSACEAE

Alchemilla bursensis B.Pawl.
Endemic. Euro-Sib. element. **EN**

Amelanchier parviflora Boiss. var. *dentata* Browicz
Endemic. E. Medit. element. **VU**

Crataegus tanacetifolia (Lam.) Pers.
Endemic. **LR(lc)**

Potentilla buccoana Clem.
Endemic. Euro-Sib. element. **VU**

RUBIACEAE

Asperula lilaciflora Boiss. subsp. *lilaciflora*

Endemic. E. Medit. element.

LR(nt)

A. lilaciflora Boiss. subsp.
phrygia (Bornm.) Schönb.-Tem.
Endemic. **LR(lc)**

A. nitida Sm. subsp. *hirtella*
(Boiss.) Ehrend.
Endemic. E. Medit. element.

LR(nt)

A. stricta Boiss. subsp.
latibracteata (Boiss.) Ehrend.

Endemic. Ir.-Tur. element.
LR(lc)

A. stricta Boiss. subsp. *monticola*
Ehrend. Endemic. E. Medit.
element. **LR(lc)**

Crucianella disticha Boiss.

Endemic. Ir.-Tur. element.
LR(lc)

Galium brevifolium Sm. subsp.
brevifolium Endemic. E. Medit.
element. **LR(lc)**

G. campanelliferum Ehrend. &
Schönb.-Tem.
Endemic. **LR(cd)**

G. dumosum Boiss.
Endemic. **LR(lc)**

RUTACEAE

Haplophyllum armenum Spach
Endemic. **LR(lc)**

H. myrtifolium Boiss.

Endemic. Ir.-Tur. element.

LR(lc)

SANTALACEAE

Thesium scabriflorum P.H.Davis

Endemic. Ir.-Tur. element. VU

SCROPHULARIACEAE

Linaria corifolia Desf.

Endemic. Ir.-Tur. element.

LR(lc)

L. genistifolia (L.) Mill. subsp.
confertiflora (Boiss.) P.H.Davis

Endemic. Ir.-Tur. element.

LR(lc)

Pedicularis cadmea Boiss.

Endemic. E. Medit. element.

LR(lc)

Scrophularia cryptophila Boiss.
& Heldr. Endemic. E. Medit.
element. **LR(lc)**

S. floribunda Boiss. & Bal.

Endemic. E. Medit element. **LR (nt)**

Verbascum adenocarpum Hub.-
Mor.

Endemic. Ir.-Tur. element. VU

V. afyonense Hub.-Mor.

Endemic. Ir.-Tur. element. EN

V. armenum Boiss. & Kotschy

var. *occidentale* Hub.-Mor.

Endemic. Ir.-Tur. element. **LR (cd)**

V. brachysepalum (Fisch. &
Trautv.) O. Kuntze

Endemic. E. Medit. element.
LR(lc)

V. cappadocicum Bornm.

Endemic. Ir.-Tur. element. **LR (lc)**

V. cheiranthifolium Boiss. var.

asperulum (Boiss.) Murb.

Endemic. **LR(lc)**

V. cheiranthifolium Boiss. var.

heldreichii Boiss.

Endemic. **LR(cd)**

V. cheiranthifolium Boiss. var.

obtusiusculum Hub.-Mor.

Endemic. **VU**

V. cheiranthifolium Boiss.

var. *pisidicum* (Boiss. & Heldr.)

Murb. Endemic. **LR (lc)**

V. chrysorrhacos Boiss.

Endemic. E. Medit. element. VU

V. heterobarbatum Hub.-Mor.

Endemic. Ir.-Tur. element.

LR(cd)

V. insulare Boiss. & Heldr.

Endemic. Ir.-Tur. element.

LR(lc)

V. krauseanum Murb.

Endemic. Ir.-Tur. element.

LR(nt)

V. lachnopus Hub.-Mor.

Endemic. Euro-Sib. element. **EN**

V. luridiflorum Hub.- Mor.

Endemic. Ir.-Tur. element.

LR(cd)

V. nudatum Murb. var. *nudatum*

Endemic. E. Medit. element.

LR(nt)

V. pestalozzae Boiss.

Endemic. E. Medit. element. **EN**

V. phrygium Bornm.

Endemic. Ir.-Tur. element.

LR(cd)

V. pycnostachyum Boiss.& Heldr.
Endemic. E. Medit. element.

LR(lc)

V. splendidum Boiss.
Endemic. E. Medit. element.

LR(lc)

V. stachydifolium Boiss.& Heldr.
var. *adpersum* (Freyn & Sint.)
Murb. Endemic. Ir.-Tur. element.
VU

V. stachydifolium Boiss.& Heldr.
var. *stachydifolium*
Endemic. Ir.-Tur. element. **VU**

V. stenocarpum Boiss. & Heldr.
Endemic. E. Medit. element.

LR(cd)

V. stenostachyum Hub.-Mor.

Endemic. Ir.-Tur. element.

LR(nt)

V. symes Murb.& Rech.fil.
Endemic. E. Medit. element. **VU**

V. tossiense Freyn & Sint.
Endemic. Ir.-Tur. element. **LR (lc)**

V. uschakense (Murb.) Hub.-Mor.

Endemic. Ir.-Tur. element.

LR(lc)

V. vulcanicum Boiss. & Heldr.
var. *vulcanicum*
Endemic. Ir.-Tur. element. **LR(lc)**

Veronica caespitosa Boiss. var.
caespitosa Endemic. E.Medit.
element. **LR (lc)**

V. cuneifolia D. Don subsp.
cuneifolia Endemic. E. Medit.
element. **LR (lc)**

V. dichrus Schott & Kotschy
Endemic. E. Medit. element.

LR(nt)

V. multifida L.

Endemic. Ir.-Tur. element.

LR(lc)

VALERIANACEAE

Valerianella glomerata Boiss. &
Bal.

Endemic. Ir.-Tur. element.

LR(lc)

MONOCOTYLEDONES

IRIDACEAE

Crocus ancyrensis (Herb.) Maw
Endemic. Ir.-Tur. element. **LR(lc)**

C. biflorus Mill. subsp. *isauricus*
(Siehe ex Bowles) B. Mathew

Endemic, E. Medit. element.
LR(lc)

Crocus flavus Weston subsp.
dissectus T.Baytop et Mathew
Endemic. **VU**

C. fleischeri Gay
Endemic. E. Medit. element.
LR(lc)

Iris kerneriana Asch. & Sint.ex
Baker

Endemic. Euro-Sib. element.
LR(lc)

I. schachtii Markgraf

Endemic. Ir.-Tur. element.
LR(lc)

JUNCACEAE

Juncus sparganiiifolius Boiss. &
Kotschy ex Buchenau
Endemic. E. Medit. element.
LR(lc)

LILIACEAE

Allium olympicum Boiss.
Endemic. Euro-Sib. element.
LR(lc)

A. phrygium Boiss.
Endemic. Ir.-Tur. element. **LR(lc)**

A. scabriflorum Boiss.
Endemic. Ir.-Tur. element. **LR(lc)**
A. sibthorpiantum Sch. & Sch. fil.
Endemic. E. Medit. element.
LR(lc)

Bellevalia tauri Feinbrun
Endemic. E. Medit. element. **LR(lc)**

Colchicum baytopiorum C.D.
Brickell
Endemic. E. Medit. element.
LR(nt)

C. burttii Meikle
Endemic. E. Medit. element.
LR(lc)

Fritillaria armena Boiss.

Endemic. Ir.-Tur. element.
LR(lc)

F. crassifolia Boiss. & Huet subsp.
crassifolia
Endemic. **LR(lc)**

Gagea bithynica Pascher

Endemic. E. Medit. element.
LR(lc)

Hyacinthella acutiloba K.M.Perss.
& Wendelbo
Endemic. Ir.-Tur. element. **LR (cd)**

H. lineata (Steudel) Chouard
Endemic. E. Medit. element.
LR(lc)

Muscari aucheri (Boiss.) Baker
Endemic. **LR(lc)**

M. bourgaei Baker
Endemic. Medit. element. **LR(lc)**

M. latifolium Kirk

Endemic. E. Medit. element.
LR(lc)

M. muscarimi Medikus
Endemic. E. Medit. element. **VU**

Ornithogalum alpigenum Stapf
Endemic. E. Medit. element.
LR(nt)

Tulipa armena Boiss. var. *lycica*
(Baker) Marais
Endemic. **LR(lc)**

POACEAE(GRAMINEAE)

Elymus lazicus (Boiss.) Melderis
subsp. *divaricatus* (Boiss. & Bal.)
Melderis

Endemic. Ir.-Tur. element.
LR(lc)

Festuca cyllenica Boiss. & Heldr.
subsp. *uluana* Markgr.-Dann.
Endemic. Euro-Sib. element. **LR (nt)**

F. paphlagonica (St.-Yves)
Markgr.-Dannenb. subsp.
paphlagonica

Endemic. Euro-Sib. element.
LR(cd)

F. pinifolia (Hackel ex Boiss.)
Bornm. var. *phrygia* (St.-Yves)
Markgr.-Dannenb.
Endemic. **LR(lc)**

Nephelochloa orientalis Boiss.

Endemic. E. Medit. element. VU

Pseudophleum gibbum (Boiss.)M.
Doğan
Endemic. E. Medit. element. **VU**

4. CONCLUSIONS AND DISCUSSION

Afyonkarahisar is geographically situated in the Inland Western part of the Aegean Region, while the plant geography is situated at the intersection of Irano-Turanian and Mediterranean regions. However, numerous plant species belonging to the Euro-Siberian plant geography also are spreading within the borders of Afyonkarahisar. Studies reveal the presence of approximately 2000 taxon which have been discovered to date on the borders of Afyonkarahisar. The number of endemic taxa in Afyonkarahisar province is 330 and endemism rate is 16.05%. 120 (36.50%) of these taxa belong to the Irano-Turanian phytogeographic region. 90 (27.27%) and 8 (2.42%) of these taxa belong to the Mediterranean and Euro-Siberian (Euxine) phytogeographical regions respectively. The number of phytogeographically unknown endemics is 112 (33.90%).

Out of these 330 endemic plants, 5 species (*Anthemis fulvida*, *Sideritis akmanii*, *Polygonum afyonicum*, *Verbascum afyonense* and *Astragalus thracicus* subsp. *afyonicus*) are only found within the province of Afyonkarahisar. *Thermopsis turcica*, which is an endangered species, is found only in two locations in Turkey; it spreads on the western bank of Eber Lake and south and west banks of Akşehir Lake which are in Afyonkarahisar province. While the endemic plant number particular for the Aegean Region is 160, the endemic species number for Afyonkarahisar being 330 is the result of the intersecting of three different geographical regions such as Inland Anatolia, the Mediterranean and Aegean regions and its topographical structure.

330 endemic taxa were evaluated according to IUCN risk categories. The results are summarised in the Table below. 216 taxa are placed in the low risk categories, while 32 are in the vulnerable category, 14 taxa are in the endangered, 1 taxa is in the data deficient, 2 taxa are in the critically endangered, 29 taxa are in the conservation dependent and 36 taxa are in the nearly threatened. Our study shows that there are no plants in Afyonkarahisar province which are in the EX (Extinct) and EW (Extinct in the wild) categories of IUCN.

Table. Risk categories of endangered endemic taxa.

Categories	LR (lc)	LR (nt)	LR (cd)	VU	EN	CR	DD	Total
Taxa	216	36	29	32	14	2	1	330

Industrialization and urbanization, extension of agricultural land and excessive pasturing, tourism, gathering from nature for import and in-

country utilization, improvement of barren lands, agricultural combat and pollution, forestation, forest fires are main contributing factors threatening and endangering the future of rare plants. Especially during recent years the Eber and Akşehir Lakes have receded and the local population has formed new fields and agricultural areas and as a result the natural habitat of *T. turcica* has suffered and all its populations have remained within fields. This plant species is able to continue its existence only via rhizomes. In addition the number of *S.akmanii* which is another endemic species in Afyonkarahisar has been reduced drastically in its natural habitat because it is consumed intensely by the local population as mountain tea and excessive pasturing of livestock. The present *S. akmanii* populations are limited to rock hollows and steep inclines which are out of reach of human beings and animals. It is vital that in situ and ex situ conservation procedures are incepted especially for these two plant species immediately. We believe that in order to maintain the richness of endemic species existing in our country to continue and be available to the next generations, the public must be made aware of the situation.

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