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A botanical excursion around(*) Köyceğiz and Dalaman

by

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Özet : Deniz seviyesindeki Köyceğiz gölü çevresi ile Dalaman ovasında Akdeniz ikliminin bütün özelliklerini belirten zengin bir bitki örtüsü vardır. Bölge bitki coğrafyası ve bitki tarihi yönünden ilgi çekici bir özellik gösterir.

Bölgenin bitki topluluğunu vertical olarak 4 kısımda tetkik etmek mümkündür.

1 — Sahil kumul bitkileri :

Bölgede Dalaman çevresi istisna edilirse, büyük düzlüklere ve sahil şeritritlerine rastlanmaz. Dalaman çayının denize döküldüğü sahada deniz kenarından itibaren içerilere doğru tesbit edilen kumul bitkileri, çorak tavalardaki halofit bitkiler, dere ve çay kenarlarındaki bitkilerle ağaç ve ağaççıkların adları metinde yazılmıştır.

2 — Maki kuşağı : Bölgede Maki şeridi bazı yerlerde bilhassa denize dik olarak inen yamaçlarda, hemen deniz ve göl seviyesinden başlıyarak 900 m. yüksekliklere kadar çıkar, burada yerini dağ ormanlarına terk eder.

Makiyi teşkil eden başlıca ağaç ve ağaççıklar ile bu ağaç ve ağaççıkların altından, açıklıklarından toplanan bitkilerin adları metinde yazılmıştır. Bunlar arasında *Phlomis schwarzii* P. H. Davis, *Origanum hypericifolium* Schwarz et P. H. Davis *Sideritis leptoclada* Schwarz et P.H. Davis türleri yeni olarak meslekdaşım İngiliz botanisti Dr. P. H. Davis ile tarafımdan bulunmuştur.

(*) A map of this region is attached

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Bölgenin en önemli ağaç topluluğunu *Liquidanbar orientalis* Mill. (Günlük, Sığla, Amber ağacı) ormanları teşkil eder. Köyceğizin kuzeyindeki alliviyonlu ova ile dalaman çiftliği kuzeyindeki sahada büyük ve saf topluluklarına rastlanan günlük ormanları, dünyada yalnız bu bölgeye has olan, üçüncü zamandan (Tersier) kalma çok kıymetli ağaçlardır. Bunlar paha biçilmez muazzam bir tabiat abidesidir. Aynı zamanda memleket ekonomisinde önemi de büyüktür. Her yıl 70 ton sığla yağı elde edilir.

3 — Orman kuşağı

Bölgede Sandras dağı ile diğer civar dağların eteklerini. büyük saf topluluklar halinde *Pinus brutia* Ten. (Kızılçam) ormanları kaplar. Bu ormanlar umumiyetle deniz kıyısından başlayarak 900 m. yüksekliğe çıkar ve burada yerini *Pinus nigra* ssp. *pallasiana* (Karaçam, bölgede Akçam denir) ormanlarına terkeder.

Sandras dağında iyi kaliteli ormanlara «Beşparmak» ormanında rastlanır.

Orman kuşağında birçok ağaç ve ağaççıkdan başka, orman altı ve açıklıklarında tesbit edilen birçok bitki türleri arasında, *Teucrium sandrasicum* Schwarz, *Senecio sandrasicum* P. H. Davis, *Centaurea ensiformis* P. H Davis türleri yeni tür olarak tesbit edilmiştir.

4 — Alp kademesi

Sandras dağının yüksekliği 2300 m. dir. Ağaç hududu 2000 m. ye kadar çıkar. Bu yüksekliğe kadar oldukça büyük gövdeli akçamlar vardır. Bundan sonra bodurlaşarak, taçları da bir şemsiye şeklini alır. Daha yüksekliklerde bodur ve dikenli ağaççıklarla, yüksek dağ bitkileri gözükmeye başlar.

Lamium sandrasicum P. H. Davis bu kademeden toplanan ve dağın adı verilen diğer yeni bir türdür. Zirveye yakın yerden toplanan diğer bitkilerin adları metinde yazılmıştır.

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Summary : The region of south-west of Anatolia around Köyceğiz lake and Dalaman plain have a rich vegetation This region shows an inteteresting characteristic from the points of view of the variety of cultural plants and richness of natural flora.

It is possible to study the Flora of this region in 4 parts vertically :

1 — Plants of sea shore :

In the region there is no vast places and wide sea stripes, except around Dalaman.

The names of the Plants of sea shore noticed at the mouth of Dalaman stream, from the sea shore to take makis, halophyte plants, on salty places, trees and shrubs with the plants along the streams and banks are metioned in text.

2 — Maki Belt :

In this region at some places Maki belt goes up to the height of 900 m. beginning from the surface of the sea and lake specially on the straight slopes. Then it leaves its place to mountain forests.

The names of trees and shrubs of Maki as well as the plants collected under them are written in the text.

The new species of *Phlomis schwarzii* P. H. Davis *Origanum hypericifolium* Schwarz et P. H. Davis, *Sideritis leptoclada* Schwarz et P. H. Davis are found by Dr. P. H. Davis, the Scotch Botanist and the writer.

The most important group of trees of this region is *Liquidanbar orientalis* Mill. The forest of *Liquidanbar orientalis* Mill. that one can find at the alluvial plain in the north of Köyeeğiz and the places in the north of Dalaman farm, are very precious trees, left from the Tersier epoque.

They are the specialities of this area in the world.

The forest of *Liquidanbar orientalis* is a magnificent natural park which makes this region a very valuable area. At the same time its importance in the economic life of this country is great. The amount of yearly production of Liquid storax is about 70 tons.

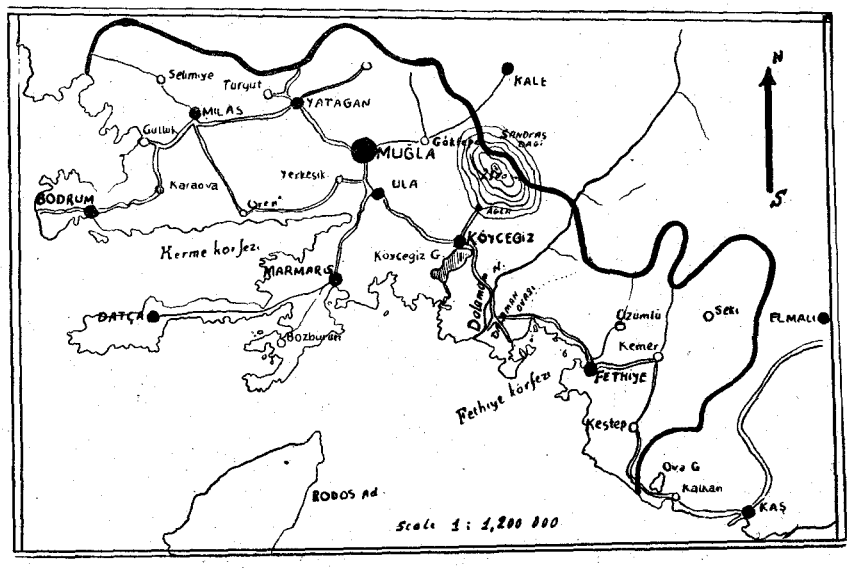
3 — Forest belt :

In this region Sandras mountain and the slopes of neighbouring mountains are covered with the forest of *Pinus brutia* Ten. as great pure groups. At some places this forest begins from the sea side goes up to the height of 900 m. At this height it gives its place to *Pinus nigra* ssp. *pallasiana*.

At this belt we have found following new species : *Teucrium sandrasicum* Schwarz *Senecio sandrasicum* P. H. Davis, *Centaurea ensiformis* P. H. Davis.

4 — Alpins :

Sandras mountain is 2800 m. high and the border of trees is 2000 m



Map of the province of Muğla

high. There are *Pinus nigra* ssp. *pallasiana* with considerable large body up to that height. Beyond this line they become smaller, plants accompany them. their crowns took the shape of an umbrella. At the highest places there appear thorny shrubs and alpin plants.

Names of the plants collected from the places near to the peak are mentioned in the text.

The new species found at this belt is *Lamium sandrasicum* P. H. Davis.

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There is a rich vegetation around Köyceğiz Lake and Dalaman plain which shows the main characteristics of the Mediterranean climate.

This area is one of the richest parts of Turkey from the points of view of the variety of cultural plants and richness of natural Flora.

This region shows an interesting character from Plant-Geography and Plant-History points of view.

I had a chance to visit the area around Közceğiz and Dalaman in 1947 and 1955; and I returned with a rich collection at each time.

We can study vegetation of this region in 4 parts in vertical way:

1 — Plant of sea shore
2 — Maki Belt
3 — Forest Belt
4 — Alpins

1 — Plants of sea shore:

In the region there is no vast places and wide stripes, except the area around Dalaman. We can see the stripe of sea shore plants at the mouth of Dalaman stream (Figure, 1).

The following plants are on the sands beginning from the sea shore:

Eryngium maritumum L., *Cakilea maritima Scop.*, *Polygonum maritimum*, L, *Juncus maritimus Lam.*, *Galilea mucronata* (L.) *Pal.*, *Cynodon dactylon* (L.) *Pers.*, *Lagurus ovatus* L., *Agropyron elongatum* (*Host*) *Pal.*, *Medicago marina* L.,

Euphorbia peplis L *Pancratium maritumum* L, *Urginia maritima* (L.), Bak., *Teucrium polium* L., *Salsola kali* L., *Marsdenia erecta* (L.) R. Br., *Echium sericeum* Vahl.

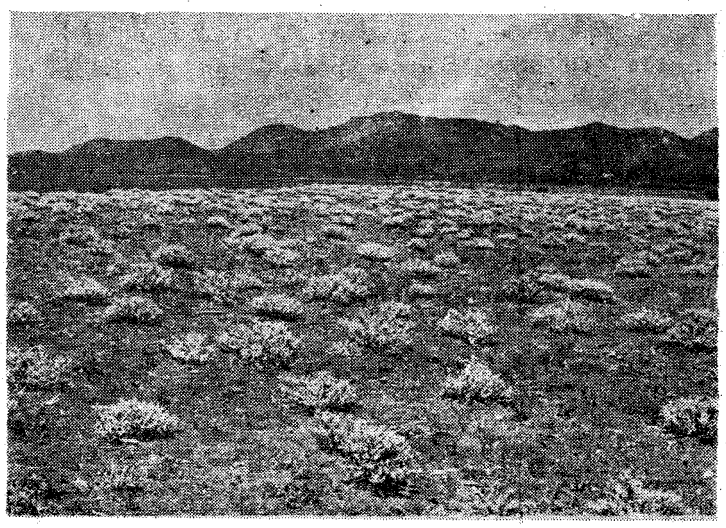

Figure 1. Plants of Dalaman sea shore

The following are the main shrubs growing on sands : *Myrtus communis* L., *Tamarix pallasii* Desv., *Thymelea argentea* (S. et S) Endl., *Thymelea hirsuta* (L.) End., *Pistacia terebintus* L., *Alhagi camelorum* Fisch. var. *turcorum* Boiss., *Nerium oleander* L., *Vitex agnus - castus* L.

Immediately after the sea shore there are salty places covered with Halopyt plants. I found the following Halophyt plants on the salty area of Dalaman Devlet Üretme çiftliği near sea shore :

Salicornia herbacea L., *Salicornia fruticosa* L., *Statice gmelini* Willd., *Atriplex portulacoides* L ,*Plantago maritima* Urv , *Spergularia marginata* (DC.) Kittel., *Panderia pilosa* F. et Mey., *Holoschoenus vulgaris* Link. var. *australis* Hal., *Aeluropus Littoralis* (Willd.) Pal , *Lepturus filiformis* (Roth.) Trin., *Hordeum maritimum* With., *Gliceria plicata* Fries.,

At the places where the amount of salt decreases I found : *Polypogon monspeliensis* (L.) Dasf., *Atropis distans* (L) Gris. var. *limosa* Schurr., *Hordeum maritimum* With., *Inula viscosa*

L., *Erythrea latifolia* Boiss. *Erytrea centaurium* Pers., *Juncus acutus* L , *Juncus subulatus* Forsk., *Amblyopyrum muticum* Eig., *Brachypodium glaucovirens* (Murr.) Fritsch , *Cynanchum acutum* L., *Cressa cretica* L , *Secale cereale* L., *Marrubium vulgare* var. *lanatum* Benth., *Imperata cylindrica* (L.) Pal., *İris ochroleuca* L , the last species grow specially on the banks of the stream.

2 — Maki Belt :

In this region at some places Maki belt goes up to the height of 900 m. beginning from the surface of the sea and lake specially on the straight slopes. Then it leaves its places to mountain Forests.

Trees and shrubs of Maki are always green due to the Mediterranean climate.

Trees and shrubs composing Maki are :

Quercus coccifera L , *Laurus nobilis* L , *Olea europaea* var., *oleaster* DC , *Strax officinale* L., *Arbutus andrachne* L., *Phillyrea media* L , *Spartium junceum* L., *Paliurus spina christi* Mill., *Juniperus oxycedrus* L , *Fraxinus oxycarpa* Willd., *Cercis siliquastrum* L., *Pistacia lentiscus* L , *Pistacia terebinthus* L., *Pistacia palaestina* (Boiss.) Post., *Cistus villosus* L , *Cistus salviaefolius* L., *Lavandula stoechas* L., *Cotinus coggygria* Scop., *Erica arborea* L., *Calycotome villosa* (Poir.) LK.,

Trees and shrubs growing on the branches of streams and rivers and on the sandy ground of valleys are :

Nerium oleander L., *Platanus orientalis* L , *Tamarix tetrandra* Pall., *Tamarix pallasii* Desf., *Vitex agnus castus* L., *Vitis silvestris* Gmel., *İnula anatolica* Boiss.,

The following plants grow on open places and under Maki:

Verbascum renzii Huber-Morath., *Verbascum cariense* Huber-Morath., *Verbascum mucronatum* Lam., *Verbascum splendidum* Boiss., *Verbascum synes* Murb. et Rech. fil., *İnula heterolepis* Boiss. *Phlomis schwarzii* P. H. Davis, *Thymus longicaulis* Presl. f. *albidus* Berger, *Origanum hypericifolium* Schwarz et P. H. Davis (Sp. Nov. above Ağla village, on serpentine). *Calamintha vulgaris* (L) Drude, *Mentha longifolia* (L.) Huds. (By Water), *Ballota nigra* L. ssp. *foetida* (Lam.) Hay., *Sideritis leptoclada*

O. Schwarz et P. H. Davis (Sp. Nov. this plant is below Ağla village on serpentin rocks in *Pinus brutia* forest, ca. 300 m.), *Stachys germanica* L. ssp. *heldreichii* (Boiss.) Hay. (By the road, thick), *Teucrium scordioides* Schreb. (at Köklüce, by stream) *Dactylis glomerata* L. ssp. *hispanica* (Roth.) Desv. (by the road), *Briza maxima* L., *Anthoxanthium odoratum* L., *Vitex agnus cactus* L.

On dry and rocky places were Maki is damaged, we observe Phrygana formation. These are small thorny shrubs.

Plants often seen are :

Poterium spinosum L , *Calycotome villosa* (Poir.) LK., *Genista acanthoclados* DC., *Asparagus acutifolius* L.,

The most important group of trees of this region is *Liquidanbar orientalis* Mill. The Forest of *Liquidanbar orientalis* that one can find at the alluvial plain in the north of Köyceğiz

Figure 2. A view of the forest of *Liqaidanbar orientalis* Mill. near Köyceğiz.

and the places in the north of Dalaman farm, are very precious trees, left from the tersier epoque. They are the specialities of this area in the world.

The forest of *Liquidanbar orientalis* is a magnificent natural park which makes this region a very valuable area. At the same

time its importance in the economic life of this country is great. It is worthy to recommend to avoid the damage done with the purpose of changing the forest into the rice fields and be accepted as a national park by protecting it from dangerous factors. By this way it can become an interesting national park well known in the world.

The forest of *Liquidanbar orientalis* composes groups at the wet places and specially on the banks of streams (Figure 3). It doesn't allow the plants under the trees to grow due to its thickness and the lack of sun-light.

The followings are the most frequent climbing plants :

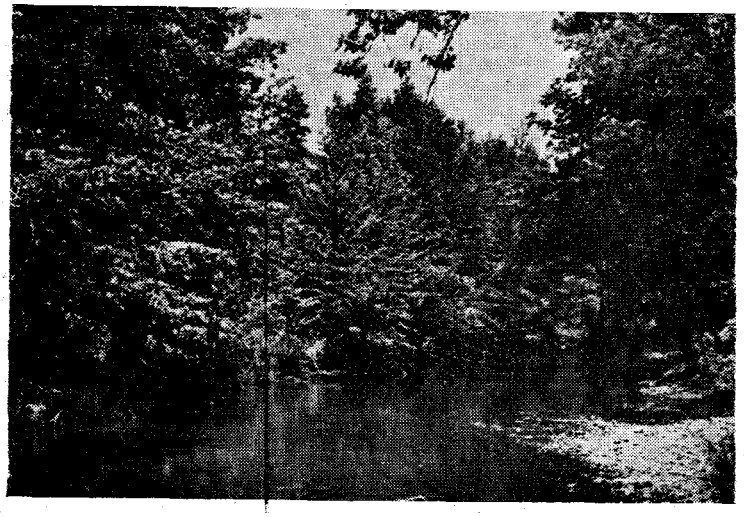

Figure 3. Köyceğiz, stream-shores, pure *Liquidanbar orientalis* forest.

Smilax exelsa L., *Peribloca graeca* L , *Tamus communis* L., *Hedera helix* L , *Vitis silvestris* Gmel. Because of the Lianas and the high rate of wet in the forest and its aromatic order the woods resemble to that of tropical regions.

Every year trunks are bruised and 70 ton of balsam (levant styrax) is producted only from that region.

The following species are frequent at wet places in the forest. *Juncus glaucus* Ehrh., *Juncus maritumus* Lam , *Juncus acutus* L., In addition, there are :

Rumex crispus L., *Mentha microphylla* C. Koch., *Holoschoenus vulgaris* Link. var. *australis* (L.) Hay., *Carex distans* L.

On the banks of streams are :

Sparganium ramosum Huds., *Samolus valerandi* L., *Alisma plantago - aquatica* L , *Phragmites communis* Trin., *Lycopus europaeus* L., *Cladium mariscus* (L.) R.Br., *Lysimachia vulgaris* L.

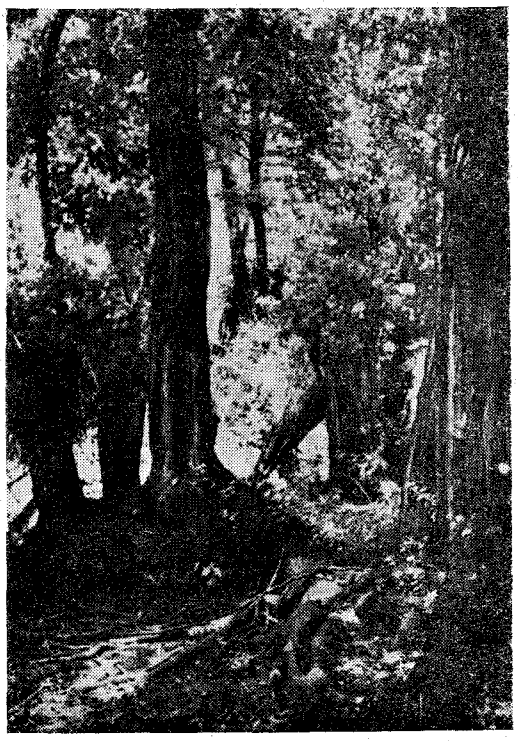

Figure 4. Under woods of Köyceğiz *Liquidanbar orientalis* forest.

At the places with less wet and along the roads :

Eucalyptus sp. and *Casuarina equisetifolia* Forst. from exotic plants grown along the streets are well grown.

Besides these mentioned above are :

Phoenix dactylifera L , *Washingtonia filifera* H. Wendl., *Hibiscus sinensis* Mill , *Agave americana* L , *Opuntia humifusa* Raf, *Opuntia ficus indica* (L.) Mill ,

Several cultural plants are seen because of the productive soil and suitable condition of climate. Sesame, tobacco, cotton and various Leguminosae, rice are the most important ones.

3 — Forest belt.

In this region Sandras mountain and the slopes of neighbouring mountains are covered with the forest of *Pinus brutia* Ten. as great pure groups. At some places this forest begins

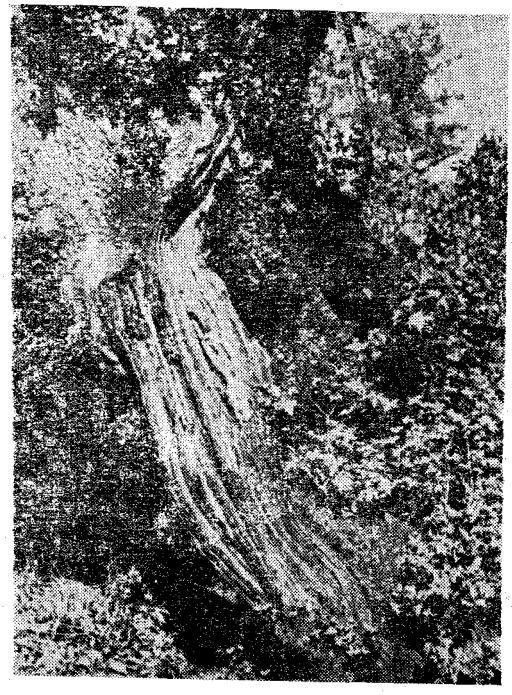

Figure 5. An old *Liquidanbar orienealis* bruised on the trunk

from the sea-side goes up to the height of 900 m. it gives its place to *Pinus nigra* ssp. *pallasiana.*

I climbed this mountain with my colleague Scotch Botanist Dr. P. H. Davis at 1947. When we climbed from Köyceğiz to Ağla village, we have seen the forest of *Pinus brutia* composed of thick trees, beginning from the height of 300 m. Young trees were in a very good position also.

Main part of trees were with 30 cm. diameter and 20 m. height. On Sandras mountain *Pinus brutia* goes up to the height 1250 m. In this forest *Alnus orientalis* Dcne. begins from the height of 700 m. along a very nice stream *Alnus orientalis* is 35-40 cm. diameter and 15-20 m. high. Generally their trunks were covered with *Hedera helix* L. Beside *Alnus orientalis* Dcne., *Platanus orientalis* L. was frequent ; and under the trees one can see *Strax officinalis* L. and on open places in the forest and along the streams *Nerium oleander* L. *Paliurus spina christi* Mill., and *Crataegus* sp. and *Daphne sericea* Vahl.

The main rock type of Sandras mountain is Serpentine. Although *Strax officinalis* L had been grown on calcare soils

Figure 6. Köyceğiz, andras mountain forest of *Pinus nigra* ssp. *pallasiana.*

At the other regions of Turkey we observed this plant on Serpentine soils in this region. It is a very interesting ecologycal position.

Ağla village which is at 600 m. height in the forest is a small village with a population 00 and 60-70 families. Villagers earn their living by growing vegetables on narrow places in the forest and by transporting snow to Köyceğiz used to make refreshments cold.

After Ağla village we came to the forest of «Beşparmak». On this mountain up to the height of 1250 m. *Pinus brutia* Ten.

is seen. and after that *Pinus nigra* ssp. *pallasiana* begins and goes up to 2000 m.

A fire in 1945 destroyed a large part of the forest on this mountain. In the following year of 1946 because of drought and bad grazing to have the forest recovered again occured under very difficult conditions. At the open places of the forest of *Pinus brutia* and *Pinus nigra* ssp. *Pallasiana* attractive and rare plants were growing.

Between Ağla village and Köklücek. plateau were :

Origanum heracleoticum L. (Ağla village ca. 600 m. dry banks and near Köklücek ca 1500 m.), *Phlomis bourgaei* Boiss. (- *Phlomis schwarzii* P. H. Davis - *Ph. viscosa* Poir. ssp. *bourgaei* (Boiss.) P. H. Davis I have seen this plant endemic for the SW Anatolia near Ağla village on the serpentine soils of *Pinus brutia* forest at ca. 600 m., *Stachys germanica* L. ssp. *heldreichii* (Boiss) Hay. *Origanum hypericifolium* Schwarz et P. H Davis, *Eryngium thoraefolium* Boiss. *Celsia pyroliformis* Boiss. et Heldr., *Celsia trapifolia* Staph. (grows specially on fire places; near Ağla village *Pinus nigra* ssp. *pallasina* forest ca. 1400 - 1500 m.), *Verbascum cariense* Huber-Morath (above Ağla village, ca. 1400 m. in *Pinus nigra* ssp. *pallasiana* forest), *V. cariense* Hober - Morath var. *asperulum* (Boiss) Murb. (near Ağla, ca. 600 m. in burnt forest), *Teucrium sandrasicum* O. Schwarz, this plant growing on the open places of *Pinus nigra* ssp. *pallasiana* 1060-1520 m. high is named after the mountain. It grows on the mountains and specially dry slopes, And the other plant named after the same mountain called *Senecio sandrasicum* P. H. Davis (sp. nov.) is among our new collection (above ağla ca. 1300 m. on rocky serpentine slopes).

Besides at the same region we observed the following plants: *Silene compacta* Fisch , *Tunica olympica* Boiss., *Sorgum halepense* (L) Pers., *Hypericum avicularifolium* Jaub. et Spach. var. *avicullariifolium Eleocharis palustris* R. Br. (by water), *Juncus articulatus* L., *Silene fabaria* (L) Sibth. et Sm., *Silene bupleuroides* L., *Cirsium libanoticum* DC., *Centaurea virgata* Lam., *Phlomis armeniaca* W., *Centaurea ensiformis* P. H. Davis (sp. nov.. obove Ağla village, near Kökçeova ca. 1700 m., on the open places *Pinus nigra*, ssp. *pallasiana* forest), *Veronica catenata* Pennell. (at Köklüce along the stream), on Gökçeova

(ca. 1700 m). under trees and on open places, *Digitalis ferruginea* L., *Thymus longicaulis* Presl. f. *albiflorus* Berger, *Thymus chaubardii* (Boiss. et Heldr.) Cel. var. *boeticus* (H. Braun) Ronn. (on serpentine); at Gökçeova on the serpentine and on the higher rocky slopes, *Thymus sipyleus* Boiss. var. *imbricatus* (Cel.) Ronn., *Calamintha troodi* Post., on shady places *Cephalanthera rubra* (L) L. C. Rich., *Tecrium polium* L. this plant goes up to 2000 m. high. *Teucrium scordioides* Schreb. (by stream), and *Juncus articulatus* L. *Galium coranatum* S. S., *Verbascum renzii* Huber-Morath (near Köklüce ca. 1500 m.), *Verbascum cariense* Huber-Morath (above Ağla village ca. 1400 m. in *Pinus nigra* ssp. *pallasiana* forest).

4 — Alpins

Sandras mountain is 2300 m. high and the border of trees is 2000 m. high. There are *Pinus nigra* ss. *pallasiana* with considerable large body up to that height. Beyond this line they become smaller, plants accompany them.

The collection picked at the height near to the top are: *Lamium sandrasicum* P. H. Davis (sp. nov.) ca, 2200 m. rare among Serpentine rock in N. gulley below a snow patch, *Thymus sipyleus* Boiss. var. *imbricatus* (Cel.) Ronn. ca. 2220 m., *Calamintha troodi* Post. *Umbilicus serpentinus* Werd. ca. 2300 m., *Lotus corniculatus* L., *Odontites aucheri* Boiss. Between Gökçeova and the peak),

Besides these plants the species of *Acantholimon* and *Festuca* sp. *Daphne oleoides* Schreb. are grown.

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