

KAZIMIERZ BROWICZ

Distribution of Woody Rosaceae in W. Asia IX

Amygdalus orientalis Duh. and closely related species

1. AMYGDALUS ORIENTALIS DUH.

Trait. Arb. et Arbust. 1 : 48 (1755); Miller, Gard. Dict. ed. 8., no 4 (1768); Spach, Ann. Scienc. Nat. Sér. 2, 19 : 118 (1843); Tchihatcheff, Asie Mineure 3 : 108 (1860); Kotschy, Verhandl. (K. K.) Zool., Bot. Gesell. Wien, 11 : 250 (1861); Boissier, Fl. Or. 2 : 642 (1872); Bornmüller, Beih. Bot. Centralbl. 28, 2 : 150 (1911); Bornmüller, Beih. Bot. Centralbl. 28, 2 : 226 (1911); Andrasovszky, Addit. ad fl. Galaticam et Lyaconicam 54 (1914); Post, Dinsmore, Fl. Syria, Palestine, Sinai 1 : 450 (1932); Krause, Ankaranon Fl. 78 (1934); Bornmüller, Beih. Bot. Centralbl. 58 B : 256 (1938); Oppenheimer, Evenari, Bull. Soc. Bot. Genève (Florula Cisjordania) 31 : 266 (1940); Mouterde, Publ. Techn. Scient. l'Ecole Franc. d'Ingenieur, Beyrouth 13:24 (1947); Parsa, Fl. Iran 2 : 531 (1948); Zohary, Dep. Agr. Iraq Bull. (The Flora of Iraq) 31:77 (1950); Birand, Plant. Turcicae 106 (1952); Browicz in Rechinger Fl. Iranica 66 : 172 (1969); Mouterde, Nouv. Fl. Liban, Syrie 2 : 204 (1970); Quézel et al., Candollea 25,2 : 381 (1970).

Syn.: *Amygdalus argentea* Lam., Encyl. Meth. 1:103 (1783).

Prunus orientalis (Duh.) Koehne, Deutsch. Dendr. 315 (1893) non Walpers (1843) nom. illeg.; Hand.-Mazz., Ann. Naturh. Mus. Wien 27 : 70 (1913); Nábelek, Publ. Fac. Sci Univ. Masaryk (Iter Turcico-Persicum, 1) 35 : 104 (1923); Rawi, Dep. Agr. Iraq. Techn. Bull. 14 : 81 (1964).

Amygdalus variabilis Bornm. ex Schneid., Ill. Handb. Laubholz. 1:591 (1905).

Amygdalus variabilis Bornm. var. *latifolia* Bornm., Beih. Bot. Centralbl 19,2 : 252 (1905).

Amygdalus orientalis Duh. var. *perlata* Bornm., Feddes Repert. Beihft. 89,1 : 220 (1940).

Prunus argentea (Lam.) Rehd., Jour. Arnold Arb. 3:27 (1922); Meikle in Townsend, Guest Fl. of Iraq 2 : 162 (1966).

Amygdalus orientalis was first discovered in Syria in the vicinity of Aleppo, probably around the middle of the XVIII century. Its fruits have been sent from there to France to Duke D'Ayen, who obtained from them a few plants for his famous garden in St. Germaines. It was probably on the basis of these plants that Duhamel (1755) prepared a Latin diagnosis — „*Amygdalus Orientalis, foliis argenteis splendentibus*”. Besides he gave also the diagnoses of four further almonds, three of which *A. sativa*, *A. dulcis* and *A. amara* belong no doubt to *A. communis* and the fourth, *A. Indica*, which was supposed to originate from India, corresponds to *A. nana*.

It is most commonly accepted that Miller (1768) is the author of the proper description of *A. orientalis* and that Duhamel's name is polynominal and invalid. However it is difficult to agree with this view since both Miller (*l.c.*) and later Lamarck (1783) and Aiton (1789) refer to Duhamel and accurately quote his diagno-

sis. Also Miller became acquainted with the species later than Duhamel. Duke D'Ayen shared with him his shrubs and sent them to him to the Chelsea Garden in 1759 (Aiton, 1789), that is four years after Duhamel has published his diagnosis. The herbarium type of *A. orientalis* is unknown to me, it is however possible that it still exists in the herbarium of the Museum National d'Histoire Naturelle in Paris. Miller's herbarium specimen does not exist in the collection of the British Museum, as I was informed by Miss D. Hillcoat, London.

Independently from Duhamel Miller prepared a somewhat more accurate description of the species in question, namely: „*Amygdalus (orientalis) foliis laciniatis interegrimis, argenteis perennantibus petiolo brevior*”. In this extended diagnosis it is most noticeable that leaves of this almond persist for the winter. This information is confirmed to some extent also by Duhamel (1809) who writes that the leaves are „[...]conserve long-temps”. In cultivation in England *A. orientalis* grew and flowered very well in open air yet it did not produce fruits (Miller, 1768), while in France as Lamarck (1783) writes it proved to be „un peu sensible à la gelée”.

Originally the data on geographic distribution of *A. orientalis* have been very scarce and general. Desfontaines (1829) for example claims that it originates from Persia, and Heynhold (1840) that it comes from Asia Minor. Author of the first monograph of the genus *Amygdalus*, Spach (1843) has had information only about four stands of the species in Syria and Turkey, while after some thirty years Boissier (1872) mentions only three more stands. It appears however that it is not such a rare species at all and in southern Turkey it is probably the most common wild growing species of almond. As distinct from *A. communis*, which entered pomological cultivation because of the value of its nuts, *A. orientalis* does not have any greater practical importance. Only Balls (*in sched.* no 813) mentions, that in Turkey in Gaziantep it is „Used as hedges around vineyards”. Also Mouterde (1970) points out that in Lebanon and in Syria it is „Parfois planté en haies”. It occurs in Turkey, Syria, Lebanon, Israel, Iraq and in Iran (fig. 1).

1. Turkey. The range of *A. orientalis* covers the central and southern part of the country. In the west it does not reach the shores of the Mediterranean and the stand reaching farthest in this direction is at Uşak in Phrygia and at Avlan Göl in Lycia. In the north it does not reach the Black sea either, and only slightly transgresses 40° Latitude north in the vicinity of Amasya and Ankara. In this last region as is indicated by Bornmüller (1940) the plant is to be found everywhere in the form of shrubs about as tall as a man. Even larger sizes, up to 3 m tall, *A. orientalis* attains in the Antalya province, district Gebiz (*in sched.* Davis 15756). In vertical distribution it occurs between 360 and 1500 m, however most frequently, as can be judged from the available data, between 800 and 1200 m. It grows on exposed dry and insolated sites, on steppehillsides limestone rocks and cliffs, gravelly ground, scattered or in thickets, sometimes in sparse and devastated oak forests, or else on edges of coniferous forests (*Juniperus*, *Cedrus*).

2. Iraq. In Iraq the range of *A. orientalis* covers only the north eastern part of the country, corresponding almost exactly to the Irano-Anatolian sub-region of Guest's Forest zone (Guest, 1966 fig. 14 and 15). It extends from Zakho in the west

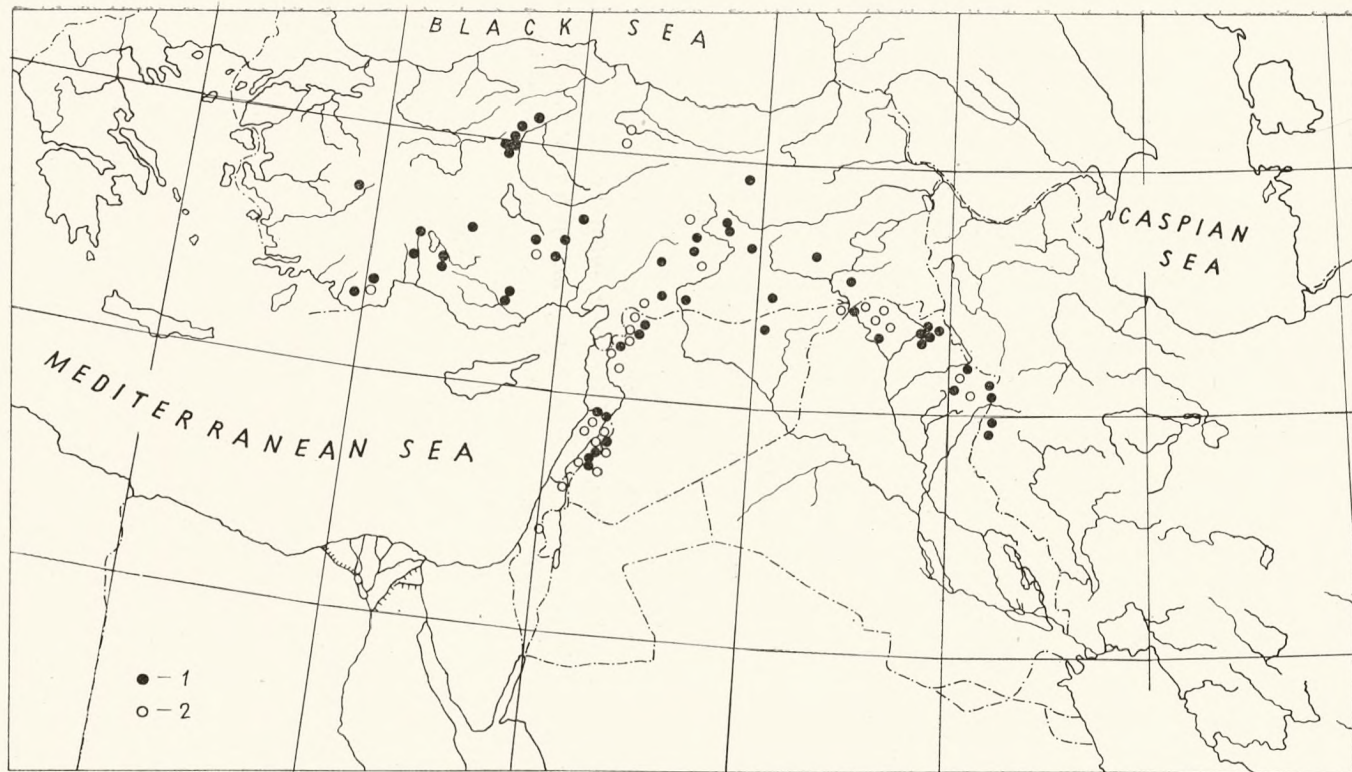


Fig. 1. Distribution of *Amygdalus orientalis*: 1. herbarium specimens, 2. literature

to Avroman mountains on the boundary with Iran in the east. Stands of this species are frequent, particularly in the region of Rawandiz between 520 and 2000 m elevation, and thus it is found in the mountains much higher up than in Turkey. According to Meikle (1966) it grows "On exposed rocky limestone slopes in coppiced oak forest, in steep banks above stream etc."

In Iraq, in the vicinity of Shaqlawa, a specimen of almond was found by Bornmüller in 1893 which he originally believed to be a hybrid between *A. orientalis* and *A. communis*, but later described it as a separate species, *A. variabilis* (Schneider, 1906), and finally he assumed it to be a variety or form of *A. orientalis* growing in shade (Bornmüller, 1905; 1938; 1940). It is characterized by exceptionally large wide leaves more or less white pubescent on both sides. This variety was included by Meikle (1966) into *A. elaeagnifolia*. It is difficult to judge these conflicting views since Bornmüller's specimens are all sterile, however the type and colour of pubescence would tend to indicate that we are dealing here with *A. orientalis*.

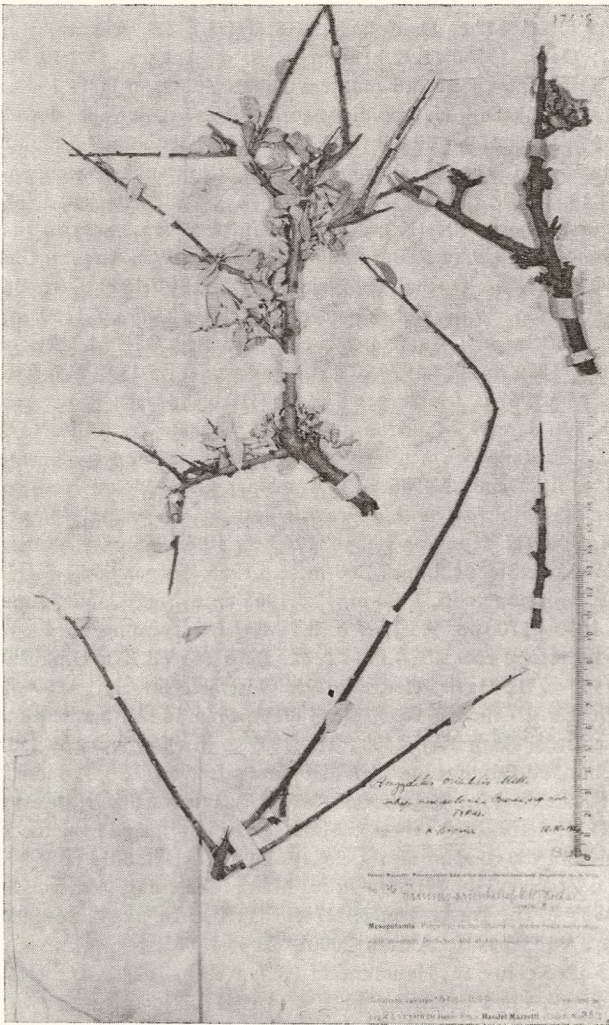
3. Syria. As distinct from Turkey and Iraq *A. orientalis* is in Syria a much more rare species, and basically speaking it occurs in only two regions, in the north-western part of the country and in the region of Damascus and on south-eastern slopes of the Anti-Lebanon Mts. It is completely absent from the central and southern part of the country. The data from Syria is very scarce and thus it can only be said that *A. orientalis* grows there on mountain slopes in rock crevices, in fields and roadsides, as well as in degraded forests at 500 to 1500 m elevation.

Apart from these two regions where the species occurs, an isolated stand can be found in north-eastern Syria on the Jebel'Abdul'Aziz, from where I have described a new subspecies – subsp. *mesopotamica* (Browicz, 1969) (fig. 2). This stand I have incorrectly located in Iraq in Qara Dagħ. Subsp. *mesopotamica* has larger, more flattened fruits and nuts with deep furrows. A second stand of this subspecies occurs also in Syria: "Inter Ainthy et Damas" (*in sched.* Unger).

4. Lebanon. *A. orientalis* grows here almost exclusively in the north-eastern part of the country, in the region between the mountain range of Lebanon and Anti-Lebanon on the one side and Baalbek and Ouwadi el Harir (bordering on Syria) on the other. Besides this region an isolated stand in south-eastern part of the country on Mt. Hermon has been found in 1911 by Aaronshon (Oppenheimer, Evenari, 1940). Data on the vertical distribution of *A. orientalis* in Lebanon is lacking and there is a lack of information about the condition under which it grows.

5. Israel. The only certain stand of *A. orientalis* in this country has been found in upper Galilee in 1906 by Aaronshon (Oppenheimer, Evenari, 1940) on Wadi es Shababik. As far as I know no one has referred to it since.

Even further south, in the Judean Mountains, near the village Kubab, *A. orientalis* grows there according to Kotschy (1861) near such species as *Quercus calliprinos*, *Paliurus spina-christi*, *Crataegus azarolus* (this is probably *C. aronia*), *Ziziphus spina-christi*, *Z. vulgaris*, *Phillyrea media*, *Rhamnus alaternus*, *Pistacia lentiscus*, *Fontanesia phillyreoides* and others. This would be the most southerly stand of *A. orientalis*, however it has not been documented by herbarium collections and therefore it has to be considered as doubtful.



Phot. Naturhistorisches Museum, Wien

Fig. 2. The type specimen of *Amygdalus orientalis* subsp. *mesopotamica* (Naturhistorisches Museum, Wien)

6. Iran. *A. orientalis* attains in Iran the eastern limit of its distribution and grows there only in Kurdistan, near the frontier with Iraq. So far only three stands of the species are known there and no detailed information about them is available.

Localities

Herbarium specimens:

1. Turkey. Paphlagonia austr.: Ad oppidum Čankri (Tschangry, Germanicopolis) in rubibus ardis in vallis Čakmakli-dere, c. 800 m, 10. 6.1929 c. fr., J. et F. Bornmüller 13421 (E.G. K.S.W.); 10 km N. of Ankara. Loose gravelly ground, on a hill slope facing east, destroyed

Quercetum, 13.7.1962, M. et D. Zohary 840 (HUJ.); Ca. 4 km N. of Ankara, S-E slope, 1200 - 1400 m, 20.8.1959 c. fr., M. et D. Zohary 2318 (HUJ.); Vil. Ankara, Hajikadun valley nr. Keçiören, 9.7.1947, Davis 13160 (E.K.); Dikmen, S. of Ankara, 13.7.1963 c. fr., M. Zohary 50314 (HUJ.); In agro Ancyritano, ad montem Dikmen-dagh in 900 - 1000 m, in aridis, J. et F. Bornmüller 13433 (LE.); Ditionis oppidi Angorae (Ancyra), in valle Kawakli-dere, c. 900 m, 5.5.1929 c. fl., J. et F. Bornmüller 13482 (E.G.K.LE.S.W.); Angora, 2.5.1933 c. fl., Balls 207 (E. K.); Ad Angora Galatiae, 1892 c. fr., Bornmüller 3030 (JE.); Ankara, Steppen, 4.1929, Bernhard (JE.); Ankara, 12.4.1932 c. fl., 28.5.1932 c. fr., Kotte (K.); Distr. Ankara, 3500', on open hillside, 11.5.1960 c. fr., Furse, Synge 104 (K.); Ad Angoram (Ankara, Ancyra) in rupibus aridis ad riv. Indije-su, 850 m, 4.6.1929, J. et F. Bornmüller 13434 (G.S.W.); Angora: Chankaya, c. 1000 m, 15.4.1926, Lindsay 80, 81 (K.); Ouchak (Phrygie) à 900 m, 31.7.1857 c. fr., Balansa 1291 (G.JE. K.LE.W.); S. Avlan Gölu, Waldrand (*Juniperus excelsa*, *Cedrus*) 1150 m, 29.5.1963 c. fr., Sorger 63-36-39 (Herb. Sorger); Antalya: W. Fuss der Bey Daglari, zwischen Sarnic Güneyi und den Avlan Gölu, 1280 m, 22.4.1970 c. fl., Bozakman, Fitz 239 (W.); Kuru Tepe, Steppenhügel, ca. 1300 m, 16.6.1967 c. fr., Sorger 67-4-48 (Herb. Sorger); Prov. Antalya, distr. Gebiz (Pisidia) 1200 m. Kozlu dere N. of Bozburun dag, 27.7.1949 c. fr., Davis 15756 (E.K.); Konya: Beyşehir — Akseki, 36 km: 16 km after Üskerles, road junction to Kurdular, rocky places, 1350 m, 29.4.1961 c. fl., Demiriz 4506 (E.); Antalya region. 55 km from Besehir, on Akseki road, limestone rocks, with *Juniperus oxycedrus* and sparse young *Abies*, 7.5.1964, Jackson 5041 (E.); 1 km N. Sille (N. Konya), Steppe, 1200 m, 10.6.1966 c. fr., Sorger 66-38-26 (Herb. Sorger); 18 km SW Mut, Steppenhügel, 360 m, 6.6.1966, Sorger 66-21-3 (Herb. Sorger); Mut to Büyük Eğri Dağ, limestone cliff, 1500 m, 12.5.1965 c. juv. fr., Coode, Jones 886 (E.); Hasan dag W of Nigde, 1000 - 1500 m. 9.5.1965 c. fl., Mathew, Tomungeon 4064 (K.); Ulukisla to Pozanti, 4000', in limestone rocks, 6.4.1934 c. fl., Balls 645 (E.K.); Ulukisla-Pozanti, 1100 m, rocky slopes, 2.4.1957 c. fl., Davis, Hedge 26295; Göreme, Nevşehir, 1200 m, 5.6.1962, Sorger 62-75a-21 (Herb. Sorger.); Cilicium, 1895, Siehe (JE.); Plantae in itinerae ad Argaeum montem lectae. Crescit in schistosi Kara Kaj, 4500', 27.5.1859 c. juv. fr., Kotschy 191 (W.); Erzinghan: prope Albuschik-Chan, ad Euphratum, 16.7.1890, Sintenis 2956 (JE.); Armenia turcica: Kharput, Servlübunar, 17.5.1889 c. juv. fr., Sintenis 366 (W.WU.); Env. of Elazig, forest remnants, 1200 m, 29.7.1962, M. et D. Zohary 2010 (HUJ.); Malatya. Rocky hillside on the south-eastern side of the city, south side of the road to Elazig, 2.6.1968 c. fr., Alava 6815 (E.); 26 km S. of Malatia, 26.8.1959, M. et D. Zohary 3301 (HUJ.); Prov. Maraş: Ahir dag, Maraş, 1200 m, rocky limestone slopes, 2.5.1957 c. fr., Davis, Hedge 27469 (E.K.); In sepib. Marash, 14.7.1868 c. fr., Haussknecht (JE.); Ad sepes c. Aintab 2000', 28.4. 1865 c. fr., Haussknecht 666 (JE.W.); Aintab, in vineis, 5.1865 c. juv. fr., Haussknecht (K.); Antab, 1824 c. fr., Herb. Montbret 1891 (W.); Gaziantep, 3000', open limestone hills, 21.4.1934 c. juv. fr., Balls 813 (E.K.); Plantae in Karduchia ad Müsküs lectae. Crescit in valle Lehirverum Maaden, 4000', 9.1859, Kotschy 799 (W.); Taurus Armenius. In valle Sassun districtus Bitilis, in declivibus supra Batman köprü, 700 - 900 m, 8.8.1910, Handel-Mazzetti 2679 (W.); Mesopotamia, Biredjik, Seitun baghtsche, 4.1888, Sintenis 124 (E.G.JE.K.LE.S.); In rupestr. Terek, 4.1867 c. fl., Haussknecht 354 (JE.LE.W.); Mardin, 16.6.1841, c. fr., Kotschy 210 (E.W.); Siirt: Cizre to Şirnak, 28 km from Şirnak, 600m, open *Quercus aegilops* scrub, 7.5.1966 c. fr., Davis 42578 (E.); Asia Minor, c. fl. Aucher-Eloy 4470 (G.LE.W.).

2. **Iraq.** Distr. Mossul. Ad confines Turciae prov. Hakkari, in ditione oppidi Zakho. In Quercetis jugi 8 km a Zakho meridiem versus, 2 - 4.7.1957 c. fr., Rechinger 10672 (W.); Mossul, c. fr., Kotschy 348 (S.); Distr. Erbil, ad radices montis Baradost prope Shanidar, inter cavernam et fontem, ca. 900 m., 24.4.1957 c. fr., Erdtman, Goedemans 15702 (W.); Erbil Liwa, Rowanduz, 6.1952, Regel 85 (G.W.); Between Mazna and Handian, 520 m (14 km from the way crossing Mergassur Erbil), 5.10.1933, Eig, Zohary 312 (HUJ.); Jebel Baradost near Diana Rowandiz, 1934 c. fr., Field, Lazar 936 (G.); 5 miles W of Diyana, 1000 m, c. fr., Helbaek 790a (C.); Shaqlawah, rough hedge near topmost spring, 19.3.1958 c. fl., Wheeler-Haines 1381 (E.); In montes Kuh-Sefin, reg. inter. supra pagum Schaklawa (ditionis Erbil), 950 m, 11.5.1893 c. fr., Bornmüller 1038 (G.JE.LE.); Ibid., 10.5.1893, Bornmüller 1039, 1040 (G.LE.W.WU.);

Distr. Serizor: ad pagum Kân-i-Watman, inter Erbil et Rowanduz, ca. 900 m, 21.5.1910, Nábelek 1881 (BAV.); Distr. Erbil. In faucibus inter Rowanduz et Bersorin, in fissuris rupium calc., ca. 700 m, 8 - 9.8.1957, Rechinger 11269 (W.); Distr. Sulaimaniya: Inter Sulaimaniya et Dokan. Inter Surdsah et Dokan, ca. 800 m, 14.6.1957, Rechinger 10123 (W.); Jarmo, 2500', 22.5.1955, Wheeler-Haines (E.); Distr. Sulaimaniya. Montes Avroman ad confines Persiae, in ditone pagi Tawilla, in saxosis calcar. 1800 - 2000 m, 1957 c. juv. fr., Rechinger 10346 (W.); Avroman, Tawilla, 25.4.1914, Petrov (LE.); Kurdistan, 9.1933, Eig, Feinbrun, Zohary 311 (HUJ.).

3. **Syria.** In decliv., Bab el Nasrin, Aleppo, 10. 4. 1865 c. fr., Haussknecht 275 (JE.); Alep, Aucher-Eloy 1427 (K); Alep, 1834, Herb. Montbret 1766 (W.). Env. of Eriha. Fields and roadsides, 27. 6.1932, Eig, Zohary 309, 310, 313 (HUJ.); Dimès, 18.3.1888, Peyron 1631 (G.); Ouadi el Quarn, 1300 m, 22.5.1932, Wall (S.); Ouwadi el Karu, 10.6.1889 c. fr., Peyron (G.); Circa Zebdaine prope Damascus. *Orygalis* ad parietes in fissuris rupium montis Gabri, 4500', 11.6.1855 c. fr., Kotschy 92.93 (S.W.); Inter Ainthi et Damas, 1858 c. fr., Unger 1858 (W.); Prope vici ruinas Gharra in medio pedis septentrionalis montium Dschebel Abd el Asis, in declivibus, substrato calcareo-argilloso, ca. 500 m, 21. 6.1910 c. fr., Handel-Mazzetti 352, 1716, 1718 (W.WU.).

4. **Lebanon.** Antilebanon: Militar-stationen, 1000 m, 20. 5. 1932, Wall (S.); Hermel-Charbine, 24.4.1943, Davis 5836 (K.); Ouadi el Harir, 29.4.1888 c. juv. fr., Peyron (G.).

5. **Iran.** Schahu (nördl. v. Kermanshah) 25. 5. 1905 c. fr., Strauss (JE.); Kermanshah: Montes Ghaladjek (Kuh-e Qalajeh), 15.5.1948, Behbudi 286 (W.); Kuh Galehadschi (Qaleh-ye Hajji), Gauba, Esafndiari 456 (W.).

Literature:

1. **Turkey.** Prov. Pontus. In monte Deweci-dagh inter Zile et Tekke, 1100 - 1200 m, 28.7.1889, Bornmüller 1029 (Bornmüller, 1940); Prov. Pontus. In collibus inter Amasia et Tokat, in rupestribus ad Turkhal, 400 - 500 m, 29.5.1890, Bornmüller 1029b (Bornmüller, 1940); Rocailles calcaires entre Korkudelli et El Mali, Quézel, et al. (Candollea 25, 2., 1970); In monte Karadagh supra pagum Madenschehir, Andrasovszky (1914. Addit. ad fl. Galaticam et Lyconicam); Kayseri, Siehe (1916. Mitt. d. Deutsch. Dendrol. Geschell.); Prope Hekim Khan, Botta (Spach, 1843); Um Kjachta, Handel-Mazzetti (Ann. k. k. naturh. Hofmus. Wien, 27., 1913); Kiillis, Post. Herb. (Post. Dinsmore, Fl. Syria, Palest. Sinai 1., 1932).

2. **Iraq.** Kantur, Rawi 8613; Mar Yakub, Handel Mazzetti; Nábëlek; Dohuk, Emberger et al. 15385; Sapna Valley, between Zakhó and Amadiya, Handel-Mazzetti; Razan, Mooney 4284; Jarmo, Helbaek 1861; Qarachitan, Gillett 7731; Qara Dagh, Poore 601; Jabal Avroman, above Darimar, Gillett 11.880 (Meilke, 1966).

3. **Syria.** Am Bohtan und Tigris unter Balak gegen Dschesiret-ibm-Omar, Handel-Mazzetti (Ann. k. k. naturh. Hofmus. Wien, 27., 1913); Qornet Mass'adi, Ma'aret-el-Bach, Pabot; Idlib, Delbès; Kafer Roumane vers Ma'aret-en-No'mane, Mouterde; Mlakbel entre Jisrech-Choghour et Eriha, Qatma, Pabot; Ouroum-es-Soughra, Pabot; Jabel. Qasyoun, Moutedre; N. of Qteifé, Pabot (Moutedre, 1970).

4. **Lebanon.** Entre Yammouné et 'Ainata, Mouterde; 'Ainata, Bornmüller; au-dessous de Hermel en descendant de Jbab-el-Homr, Mouterde; Baalbeck, Ras Baalbeck, Mouterde; Sources de l'Oronte, Mouterde (Moufèrde, 1970); Mont Hermon: El Qela', 6.7.1911, Aaronshon 3718 (Oppenheimer, Evenari, 1940).

5. **Israel.** Galilée superieur, Wadi esh Shababik, 14. 6.1906, Aaronshon 3728, (Oppenheimer, Evenari, 1940); Kubab (Kotschy, 1861.).

2. *A. GRAECA* LINDL.

in Sibthorp et Lindley, Fl. graeca 10:71 (1840)

Syn.: *Amygdalus incana* Sibthorp, et Smith, Fl. graecae prodromus 1:337 (1809); Fl. graeca 5:61 t. 477 (1825) non Pallas.

Amygdalus orientalis Duh. var. *discolor* Spach, Ann. Scienc. Nat. sér. 2., 19:119 (1843);



Phot. K. Jakusz

Fig. 3. The oldest drawing of *Amygdalus graeca* made in 1825 (Sibthorp, Smith — *Flora graeca*, 5)

Boissier, *Fl. Or.* 2:643 (1872); Forsyth-Major, Barbey, *Bull. Herb. Boiss.* 4,1:28 (1896); Fiori, *Annali d. R. Inst. super. forest. naz.* 9:21 (1924); Post, Dinsmore, *Fl. Syria, Palestine, Sinai* 1:450 (1932); Thiébaud, *Fl. Liban.-syrienne* 2:100 (1940); Mouterde, *Nouv. Fl. Liban, Syrie* 2:204 (1970).

Amygdalus discolor (Spach) Roem., *Syn. monogr.* 3:12 (1847).

Prunus discolor (Spach.) Schneid., *Ill. Handb. Laubholz.* 1:591 (1905); Rechinger, *Fl. aegaea* 313 (1943); Rechinger, *Vegetatio*, 2:83 (1950).

Prunus orientalis (Duh.) Koehne, var. *discolor* (Spach) Schneid., *Ill. Handb. Laubholz.* 1:591 (1905).

This almond has been found by J. Sibthorp in 1786 in the western part of Turkey near Smyrna (presently Izmir). However information on it has been published considerably later at the beginning of XIX century by Sibthorp and Smith (1806 - 1809), however they have falsely identified it as *Amygdalus incana*, which name has already been given by Pallas to a completely different species growing on the Caucasus, in northern Iran and in northern Turkey, which is now included in the genus *Cerasus*

as *Cerasus incana* (Pall.) Spach. An accurate description of this new species and a very good colour drawing of it (a leafy shoot with flowers) also under the name *Amygdalus incana* has been published by Sibthorp and Smith in 1825 in the fifth volume of their magnificent "Flora Graeca". (fig. 3).

The error in nomenclature has been corrected somewhat later by Lindley (Sibthorp, Lindley, 1840) in the tenth and last volume of this work. In the second appendix (Appendix secunda) to this volume Lindley has changed the name *Amygdalus incana* into a new correct name — *Amygdalus graeca* and gave the following Latin diagnosis of it: *A. graeca ramis spinosis tomentosis, foliis obovatis retusis serratis subtus et margine tomentoso-niveis, calycibus tubulosus*". This new name was completely forgotten and it is also not mentioned by "Index Kewensis" (I am greatly indebted to Dr. D. F. Chamberlain, Edinburgh, for drawing my attention to it). The specific name "graeca" proved to be not a very satisfactory one since the species grows in Greece on only two islands, while its main range covers Turkey and Syria.

The second time this species was found in Syria near Aleppo, that is at the other end of its distribution. This was done by Coquebert de Montbret and Aucher-Eloy. Spach (1843) who presumably did not know Lindley's diagnosis described it as a new variety, var. *discolor* within the species *Amygdalus orientalis*. This name was later elevated to species rank as *A. discolor* by Roemer (1847) and it is primarily under this name (or possibly *Prunus discolor*) that this species was later known.



Fig. 4. Distribution of *Amygdalus graeca*: 1. herbarium specimens, 2. literature, and *A. × balansae*: 3. herbarium specimens

As can be judged on the basis of the data available so far *A. graeca* is a much more rare species than the closely related one *A. orientalis* and that it generally has a much more southerly range, which is split into two parts, western and eastern (fig. 4). An isolated stand is also known from the north in the region of Ankara. The western part of the range includes the Greek islands Kalimnos and Rhodos and the south-western part of Turkey, in particular Caria. *A. graeca* grows there in the form of shrubs, 1 - 2 m high, on calcareous rocks, in association of maquis and phrygana, between 10 and 500 m elevation, that is on stands considerably lower located that is the case for *A. orientalis*.

As regard the eastern part of the range it lies in northern Syria, from where Mouterde (1970) mentions several stands, however there are no detailed information about these stands.

As far as I know *A. graeca* has never been introduced into cultivation.

Localities

Herbarium specimens:

1. **Greece.** In saxosis calcareis montis Kirapsili, ad 500 m, Kalymnos, 8. 4. 1888 c. juv. fr., Forsyth-Major 864 (E.); Insula Rhodos. In saxosis calc. montium Marmara prope Lindos, ca. 300 m, 25.6.1935 c. fr., K. H. et F. Rechinger 8457 (K.W.).

2. **Turkey.** Ad viam inter Smyrnam et Bursam, 1786 c. juv. fr., Sibthorp (K. - TYPUS); Müğla: Ören, 50 m. Rocky limestone slopes facing south, 10.4.1965 c. fr., Davis 40866 (E.); Müğla:d. Marmaris:Cumali to Resadiye, 200 m, Limestone rocks, 17.4.1965 c. fr., Davis 41257 (E.); Molah, c. fr., Aucher-Eloy 1839 (W.); Müğla:distr. Fethiye:Kaya, 50 m. Phrygana on hillsides, 28.3.1956 c. fl., Davis 25443 (E.K.); In rupestribus ad Du-den prope Elmalu, 3.6.1860 c. fr., Bourgeau 123 (E.G.K.W.); Pamphylia:Konya, 10 m, 24.1.1936 c. fl., Tengwall 68 (K.S.); Env. of Ankara, near Cubuk Dam. Maquis of *Amygdalus orientalis*, 14.7.1963 c. fr., Zohary 50918 (H.U.J.).

3. **Syria.** Alep, c. fr., Aucher-Eloy 1427 (G.).

Literature:

1. **Greece.** Rhodos, zwischen Lindos und Jannadi, Kalkfelsen, Fiori 215 (Rechinger, 1943).

2. **Turkey.** In Caria ad Gheyra, Boissier (Boissier, 1872).

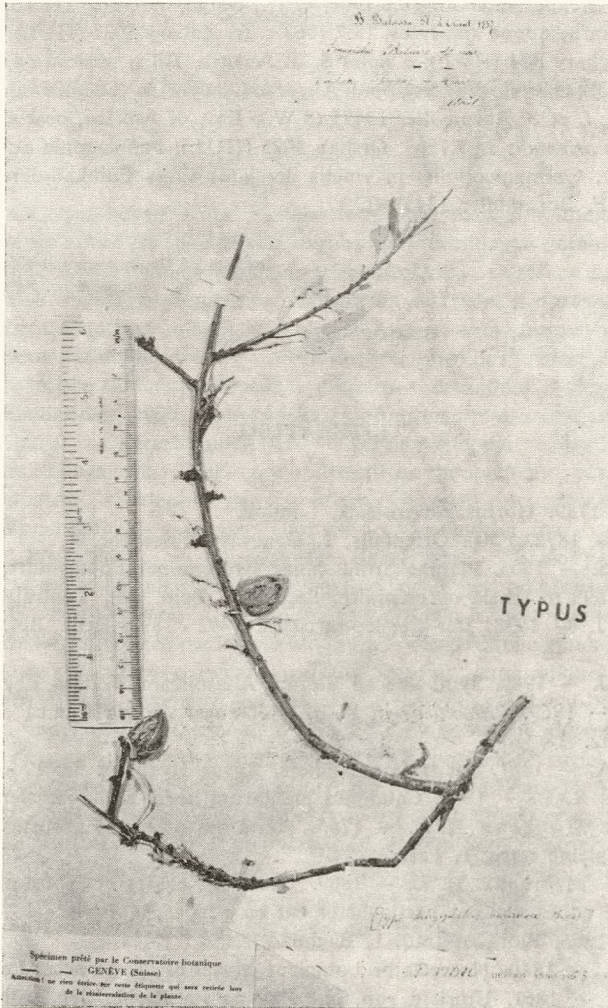
3. **Syria.** Prope Halep, Coquebert de Montbret (Spach, 1843); Ouroum-es-Soughara, Pabot; Kafer Roumane vers Ma'aret-en-No'mane (Mouterde, 1970).

3. *AMYGDALUS* × *BALANSAE* BOISS.

Diagn. Pl. Or. Nov. Sér. 2., 3(6):71(1859) pro sp.; Tchihatcheff, *Asie Mineure* 3:108 (1860); Boissier, *Fl. Or.* 2:642 (1872); Schneider, *Ill. Handb. Laubholzk.* 1:592 (1905); Bornmüller, *Beih. Bot. Centralbl.* 58 B:257 (1938).

Syn.: *Amygdalus balansae* Boiss. var. *supervestita* Bornm., *Feddes Repert. Beihft.* 89,1:220 (1940).

Hybrid of *A. communis* × *A. orientalis*, characterized by having intermediate features, particularly as regards the degree of shoot and leaf pubescence, the size of fruits and the surface morphology of the stones. It was found in 1857 by the French botanist Balansa in Phrygia, Turkey, near the town of Uşak (fig. 5). As is reported by Carrière (1861) Balansa brought to Paris its fruits, as well as fruits of two other almonds, which grew near Uşak, namely *A. orientalis* and *A. sa-*



Phot. K. Jakusz

Fig. 5. The type specimen of *Amygdalus* × *balansae* (Conservatoire et Jardin Botanique, Genève)

licifolia Boiss. (represently *A. webbii* Spach). A part of the seeds he gave to the Museum of Natural History and part he offered to seed dealers.

A × *balansae* is known so far from 9 stands in central Anatolia, and is more common only in the vicinity of Ankara (fig. 4). It grows in stands from where also herbarium specimens of *A. orientalis* have been collected, that is in similar localities as the latter species, between 800 and 1200 m elevation.

Localities

Herbarium specimens:

1. **Turkey.** Ouchak (Phrygie). Haies, 910 m, 8. 1857 c. fr., Balansa (G. — TYPUS); Kuru Tepe, Steppenhügel, ca. 1200 m, 14.6.1966, Sorger, 66-44-21 (Herb. Sorger — Linz); 1 km N.

Sillet (N. Konya) Steppe, 1200 m, 10.6.1966, c. fr., Sorger 66-38-26 (Herb. Sorger — Linz); Dikmen, S. of Ankara, steppe and trees, 13.7.1963 c. fr. Zohary 5037 (HUJ.); Env. of Dikmen, 19.6.1953 c. fr., Zohary 304 (HUJ.); 6 miles S. of Ankara. Hills, western exposure, 28.6.1963, Zohary 28196 (HUJ.); Galatia: ditionis oppidi Angorae (Ancyra) in valle Kawakli-dere, ca. 900 m, 5.5.1929 c. juv. fr., J. et F. Bornmüller 13435 (S.W.); Env. of Ankara, near Cubuk Dam, Maquis of *Amygdalus orientalis* 14.7.1963, Orshan 5093 (HUJ.); Paphlagonia austr.: Ad oppidum Çankri (Tschangry, Germanicopolis) in vinetis derelictis vallis Çamkali-dere, ca. 800 m, 6 - 16.6.1929, J. et F. Bornmüller 13437 (G.).

Institute of Dendrology and Kórnik Arboretum
Kórnik nr. Poland

LITERATURE

1. Aiton W. — 1789, Hortus kewensis, 2, London.
2. Boissier E. — 1872. Flora Orientalis, 2, Genevae et Basileae.
3. Bornmüller J. — 1905. Plantae Straussianae sive enumeratio plantarum a Th. Strauss annis 1889 - 1899 in Persia occidentali collectarum, Beih. Bot. Centralbl. 19,2:195 - 270.
4. Bornmüller J. — 1938. Iter Persico-turcicum 1892 - 1893, Beih. Bot. Centralbl. 58B: 252 - 302.
5. Bornmüller J. — 1940. Symbolae ad Floram Anatolicam, Feddes Repert. Beihft. 89,1.
6. Browicz K. — 1969. *Prunoideae* in K. H. Rechinger „Flora Iranica”, *Rosaceae* I., 66: :161 - 203, Graz.
7. Carrière E. A. — 1861. Sur trois amandiers, Revue Horticole 33: 17 - 20.
8. Desfontaines R. L. — 1829. Catalogus plantarum horti regii Parisiensis, ed. 3, Paris.
9. Duhamel du Monceau H. L. — 1755. Traité des arbres et arbustes qui se cultivent en France en pleine terre, 1, Paris.
10. Duhamel du Monceau H. L. — 1809. Traité des arbres et arbustes que l'on cultive en pleine terre en Europe, et particulièrement en France, 4, Paris.
11. Guest E. — 1966, Flora of Iraq, 1, Baghdad.
12. Heynhold G. — 1840. Nomenclator botanicus hortensis, 1, Dresden-Leipzig.
13. Kotschy Th. — 1861. Umriss von Südpalästina im Kleide der Frühlingsflora, Verh. k. k. zool.-bot. Gesellsch, 11: 244 - 260.
14. Lamarck J. B. A. P. — 1783. Encyclopédie méthodique. Botanique, 1, Paris.
15. Meikle R. D. — 1966. *Rosaceae* in Townsend C.C. and Guest E., „Flora of Iraq” 2:102 - - 171, Baghdad.
16. Miller P. — 1768. The gardeners dictionary, ed. 8., London.
17. Mouterde P. — 1970. Nouvelle Flore du Liban et de la Syrie, 2, Beyrouth.
18. Oppenheimer H. R., Evenari M. — 1940. II. Florula Cisjordanica, Bull. d. 1. Soc. Bot. d. Genève, 2 sér., 31:1 - 423.
19. Rechinger K. H. — 1943. Flora Aegaea, Wien.
20. Roemer M. — 1847. Familiarum naturalium regni vegetabilis synopses monographicae, 3, Weimar.
21. Schneider C. K. — 1906. Illustrierte Handbuch der Laubholzkunde, 1, Jena.
22. Sibthorp J., Smith J. E. — 1806 - 1809. Florae graecae prodromus, 1, London.
23. Sibthorp J., Smith J. E. — 1825. Flora graeca, 5, London.
24. Sibthorp J., Lindley J. — 1840. Flora graeca, 10, London.
25. Spach E. — 1843. Monographia generis *Amygdalus*, Annales d. Sc. Natur., sér, 2., 19: 106 - 128.

KAZIMIERZ BROWICZ

Amygdalus orientalis Duh. i gatunki blisko spokrewnione

Streszczenie

Na podstawie bogatych zbiorów zielnikowych oraz danych z literatury, każdorazowo cytowanych, omawia autor zasięgi 3 blisko ze sobą spokrewnionych gatunków migdałów z południowo-zachodniej Azji, a mianowicie *A. orientalis* Duh., *A. graeca* Lindl. i *A. × balansae* Boiss. Oprócz tego podaje wiadomości o historii ich odkrycia i wprowadzeniu do uprawy.

A. orientalis został odkryty w Syrii, w okolicach Aleppo, około połowy wieku XVIII i w tym samym czasie wprowadzony do uprawy we Francji przez księcia D'Ayen. Jego zasięg obejmuje środkową i południową Turcję, północną i częściowo zachodnią Syrię, północno-wschodni Irak, Liban i zachodni Iran (tylko 3 stanowiska). Oprócz tego podawany jest z dwóch stanowisk z Izraela — w Galilei i w górach Judejskich. W Turcji występuje między 360 - 1500 m n.p.m., podczas gdy w Iraku sięga aż po 2000 m n.p.m. Rośnie na zboczach gór i w szczelinach skalnych, na wapiennym podłożu, w zdegradowanych lasach dębowych oraz przereźdzonych zaroślach, na suchych, nasłonecznionych terenach. Dorasta do wysokości 3 m.

Drugi gatunek migdału — *A. graeca* został odkryty przez Sibthorpa w 1786 roku w zachodniej Turcji, w pobliżu Izmiru, lecz najczęściej podawany jest pod inną nazwą — *A. discolor* (Spach) Roem. W odróżnieniu od *A. orientalis*, który posiada liście obustronnie biało owłosione i ostre na wierzchołku, *A. graeca* ma liście biało kutnerowate tylko po spodniej stronie, a z wierzchu i to od samego początku rozwijania całkowicie nagie, zaokrąglone na wierzchołku lub nawet nieznacznie wycięte. *A. graeca* jest gatunkiem znacznie rzadszym od *A. orientalis* i charakteryzuje się porozrywanym zasięgiem. Z jednej strony występuje głównie w południowo-zachodniej Turcji oraz na greckich wyspach Kalimnos i Rhodos, a z drugiej strony, po znacznej przerwie, dopiero w północnej Syrii. W Turcji rośnie w formie krzewów 1 - 2 m wysokich, na wysokości od 10 - 500 m n.p.m. Do uprawy nie był nigdy wprowadzony.

A. × balansae jest mieszańcem *A. communis* i *A. orientalis* znanym jak dotąd tylko z 9 stanowisk w Turcji. Został odkryty w 1857 roku przez botanika francuskiego Balansę, który w tym samym roku przywiózł jego owoce do Paryża i wprowadził do uprawy. Rośnie w podobnych warunkach co i *A. orientalis*, na wysokości 800 - 1200 m n.p.m.

КАЗИМЕЖ БРОВИЧ

Amygdalus orientalis Duh. и близкородственные виды

Резюме

Основываясь на просмотренных богатых гербарных материалах и на цитируемых литературных данных, автор анализирует ареалы трёх близкородственных видов миндаля по юго-западной Азии, а именно: *A. orientalis* Duh., *A. graeca* Lindl., *A. × balansae* Boiss. Кроме того статья содержит сведения об истории их открытия и введения в культуру.

A. orientalis был открыт в Сирии, в окрестностях Алеппо, около середины XVIII в. и в те же годы введен в культуру во Франции герцогом Айенским. Его ареал охватывает центральную и южную Турцию, северную и частично западную Сирию, северо-восточный Irak, Ливан и западный Iran (только три местонахождения). Кроме того, указывается из двух местонахождений в Израиле: Галилея и Иудейские горы. В Турции произрастает между 360 - 1500 м над ур. м., а в Ираке поднимается до 2000 м. Растёт на склонах гор, в скалистых ущельях, на известняковых породах, в деградированных дубовых лесах и изре-

женных зарослях кустарников, на сухих и освещённых солнцем местах. Достигает в высоту до трёх метров.

Другой вид *A. graeca* был открыт Зибторпом в 1786 г. в западной Турции, близ Измира, но чаще указывается под другим названием как *A. discolor* (Sprach) Roem. В отличие от *A. orientalis*, у которого листья с обеих сторон белоопушенные и с заостренной верхушкой, листья *A. graeca* ворсисты только с нижней стороны (с верхней стороны они с самого начала совершенно голые), а их верхушки округлые или даже слегка выемчатые. *A. graeca* — вид значительно более редкий, чем *A. orientalis*, ареал его разорван. Основная часть ареала расположена в юго-западной Турции и на греческих островах Калимнос и Родос, меньшая, после значительного разрыва, — в северной Сирии. В Турции вид произрастает в форме кустарников одного-двух метров в высоту на 10 - 500 м над ур. м. В культуру нигде не вводится.

A. × balansae является гибридом *A. communis* и *A. orientalis*. Он известен только из девяти местонахождений в Турции. Был открыт в 1857 г. французским ботаником Балансом, привезшим в этом же году его плоды в Париж и введшим вид в культуру. Растёт в тех же условиях, что и *A. orientalis*, на высотах 800 - 1200 м над ур. м.