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On the geographic distribution of *Crataegus heldreichii* Boiss.

Abstract

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On the basis of herbarium collections and literature data a list of stands was made and point map of distribution was drawn for *Crataegus heldreichii*, an endemic species of hawthorn for the Balkan peninsula.

Additional key words: point map.

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Of the seven species of hawthorns growing on the Balkans five have a range extending beyond the peninsula while two are endemic. One of these is *Crataegus pycnoloba* Boiss. et Heldr., extremely interesting, both from the morphological and the taxonomic point of view, which is known from only a few stands from the northern Peloponnesus. The other endemic Balkan species is the much more widely distributed *C. heldreichii* Boiss.

The Heldreich's hawthorn has been described by Boissier in 1865 from Greece, from Mt. Parnes. It is a shrub or a small tree with more or less lobed, densely gray tomentose leaves and with small reddish fruits with (3-)4 - 5 stones (Fig. 1). On the basis of the fruit structure it is included within the genus *Crataegus* to section *Azaroli* Loud., to which also the above mentioned *C. pycnoloba* belongs as well as *C. orientalis* Pallas, *C. aronia* (L.) Bosc. ex DC., *C. tanacetifolia* (Lam.) Pers., *C. pontica* K. Koch and *C. szovitsii* Pojark.

In its typical form *C. heldreichii* is quite a characteristic species, easy to recognize, however, in the vegetative state it is frequently mistaken with other hawthorns and particularly with forms of *Crataegus monogyna* Jacq. with strongly pubescent leaves. However, full, well collected material precludes any possibility of error.

The distribution of *C. heldreichii* is as yet sufficiently well known. Franco (1968) reports that the species occurs in southern Albania, in central and southern Greece and on Crete, however, he does not mention Jugoslavia where in Macedonia

it is relatively common. This is well documented by a point map of distribution prepared for the Yugoslav Macedonia by Džekov (1974). Besides it has also been found beyond Macedonia, namely in Serbia on Mt. Korytnik (Jovanovič 1972).

The map in question as well as stands of *C. heldreichii* in northeastern Greek Macedonia would appear to indicate that the species could possibly occur also in Bulgaria, which as it turned out proved true (Stojanov 1924, Zieliński 1984), however, in the newest flora of Bulgaria it has not been included by Jordanov (1973).



Fig. 1. *Crataegus heldreichii* Boiss. (Drawn by J. Dolatowski)

The greatest unknown in this respect is Albania. Many authors include it in the range of *C. heldreichii* (Mitrushi 1966, Franco 1968, Byatt 1976, Demiri 1983), however, we failed to find a single definite information that could confirm this, nor any herbarium specimen collected in that country. From the distribution of that hawthorn in adjacent regions of Yugoslavia and Greece one can suspect that within the range of *C. heldreichii* one should at least include the southern and central parts of Albania — we have indicated this on the map with a broken line (Fig. 2).

The main parts of the range of *C. heldreichii* occupy continental Greece. On the islands it grows only on a few stands and this only on Euboea and on Andros. It has been also reported from Crete (Rechinger 1943b), however, this information is old and it has never been confirmed. When reevaluating numerous collections in various European herbaria we have not found a single specimen that would document its presence on Crete. On the other hand *C. monogyna* Jacq. subsp. *azarella* (Griseb.)

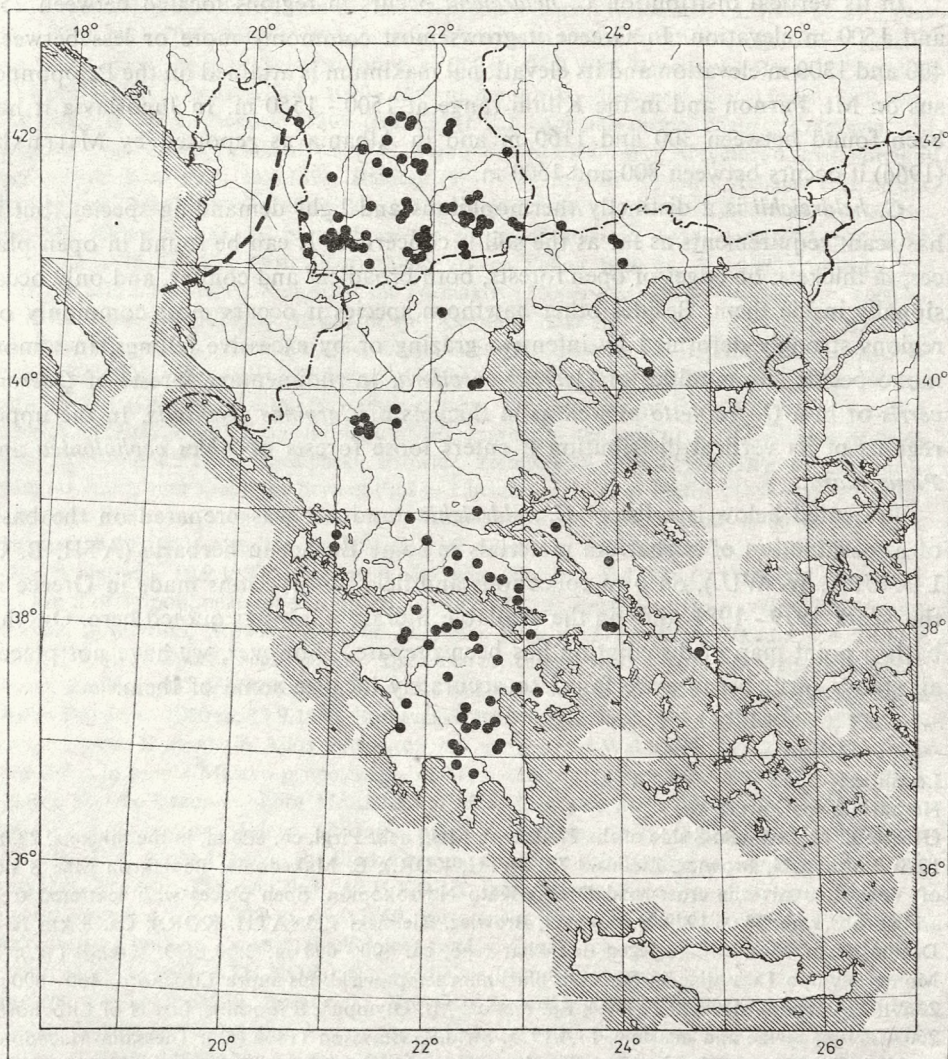


Fig. 2. The distribution of *Crataegus heldreichii*

Franco is common here with strongly pubescent leaves and it is not unlikely that extremely pubescent forms of this subspecies may have been erroneously described as *C. heldreichii*. Also Greuter (1974) considers *C. heldreichii* to be erroneously reported from Crete. Byatt (1976) in her detailed description of hawthorns.

in Greece also does not mention it from this island. According to Regel (1938) *C. heldreichii* possibly grows on Corfu Is., on Mt. Pantokrator, near a monastic settlement at an elevation of 800 m — however Regel was not sure of his identification. It is worth mentioning that Hansen (1982) mentions another species of hawthorn from Pantokrator Mt., *C. orientalis*, it is not unlikely therefore that Regel's information is erroneous.

In its vertical distribution *C. heldreichii* occurs in regions located between 250 and 1500 m elevation. In Greece it grows most commonly more or less between 400 and 1300 m elevation and its elevational maximum is attained on the Peloponnese on Mt. Parnon and in the Killini range at 1500 - 1550 m. In Yugoslavia it has been found between 300 and 1160 m and in Albania as reported by Mitrushi (1966) it occurs between 800 and 1500 m.

C. heldreichii is a distinctly thermophilous and light demanding species, but it has scant requirements as far as the soil is concerned. It can be found in open places, in thickets, on edges of open forests, both broadleaf and conifer, and only occasionally inside them. Besides other hawthorn species it occurs most commonly on regions strongly deformed by intensive grazing or by excessive fellings, in almost monospecific communities of *Quercus coccifera*, in rudimentary forests of *Quercus cerris* or in a *Q. frainetto* as well as in thickets of *Carpinus orientalis*. In the upper regions of its vertical distribution it enters loose forests of *Abies cephalonica* and *Pinus nigra*.

Presented below is a list of *C. heldreichii* stands. It was prepared on the basis of a reevaluation of herbarium materials in some European herbaria (ATH. B. C. LD. UPA. W. WU.), on own collections and field observations made in Greece in the years 1979 - 1981 and on the available literature, always quoted here. On this basis a point map of distribution has been prepared, however, we have not placed all stands on it because we failed to accurately localize some of them.

Localities:

Herbarium specimens:

Greece: E. Macedonia: S side of the Phalakron Mts., near Pirci, ca. 800 m, in the thickets, 28.06.1979, Boratyński, Browicz, Zieliński 751 (ATH. KOR.); E. Macedonia: Phalakron Mts. S side of Voax towards the cross-road Drama-Kato Nevrokopion, open places with scattered trees and shrubs, rare, 28.06.1979, Boratyński, Browicz, Zieliński 725 (ATH. KOR.); Ca. 8 km N of Drama, N of Monastiraki gegen den Pilar tepe, ca. 400 - 600 m. 2.06.1979. Krendl (W.); In Monte Olympo Thessaliae, in fructibus plurimum semperviridibus supra Litochoro, 400 - 600 m, 22.7.1927, Handel-Mazzetti 22 (W.); Ep. Pierias: Mt. Olympus, E foothills, just N of Litochoron 250 - 280 m, ravine and macebie, 17.6.1975, Strid, Gastavsson 11466 (C.); Thessalia-Macedonia occidentalis: Montes Chasia (Chassia), in quercetis inter Gria et Grevena, ca. 500 - 800 m, 10.5.1961, Reehinger 23022 (W.); Kalampaka: in silva ad Hagios Georgios, 15.5.1896, Sintenis 664c (LD.); Kalampaka: ad monastir Meteora, 20.5.1896, Sintenis 664b (LD.); N. Thessalia: Between Korydallos and Metsovon near the road ramification to Malakasion, thicket among the pastures, 10.9.1981, Boratyński, Browicz, Zieliński 1474 (ATH. KOR.); Malakasi, 19.6.1896, Sintenis 664 (LD.); Epiros, near the pass Atchin Katarus, road to Metsovon, 10.08.1931., Boratyński, Browicz, Zieliński (in observ.); N. Akarnania: the light thicket on the slopes of the hills among the Tayrion, Vustrion and Tryphos, ca. 400 - 600 m, 17.9.1981, Boratyński, Browicz,

Zieliński 1625 (ATH. KOR.) Pthiotis, ca 20 km N of Lamia, along the road to Larisa, *Quercus coccifera* scrub, ca 600 m, 2.10.1980, Boratyński, Browicz, Zieliński 1377 (ATH.KOR.); Fokis: Near Pyrgos, between Amphissa and Gravia, rocky slope covered with *Abies cephalonica* forest, 750 - 850 m, 1.10.1980, Boratyński, Browicz, Zieliński 1348, 1353 (ATH. KOR.); Böötien: 15 km westlich von Levadia, and der Strasse nach Delphi, 320 m, 17.5.1967, Pfdenhauer (B.); Achaia: mons Panachaikon, in declivibus occidentilibus cacuminis, supra pagum Pournarakstron, 1350 m, 22.6.1973, Phitos 11880 (UPA.); Achaia: in m. Panachaiko, 19 - 23.5.1949, Goulimis (ATH.); Achaia: Montes Erymanthos, supra pagum Kalousion, ca. 1000 m, 27.6.1967 Phitos 7010, 7011, 7012, 7018 (UPA.); Achaia, W slopes of the Erimanthos Range, above Kaletzi, open slopes below *Abies cephalonica* forest, ca 900 m, 28.9.1980, Boratyński, Browicz, Zieliński 1321 (ATH. KOR.); Achaia: ibid., 1000 - 1200 m, among the *Abies cephalonica* forest, 20.9.1980, Boratyński, Browicz, Zieliński 1309 (ATH. KOR.); Achaia: prope pagum "Kalavryta" ad coenobium Agia Lavra, ca 800 m, 6.6.1926, Bornmüller 619 (LD. W.); Arcadia: ad ripas Voreikos prope pagum Kalavryta, 16.6.1893, Halácsy (WU.); In montes Kyllenes Achaiae reg. media. prope pagum Trikala, 3500' - 4000' 20.6.1887, Heldreich (WU.); Nom. Korinthias, Ep. Korinthias: Mt. Killini (Ziria), SE part, above the village of Bouzion, 1450 - 1550, 3.7.1979 Strid, Papanicolaou 15336 (C.); Distr. Korinthias: Village Velina 1050 m, 21.5.1972 Zambelis 178 (ATH.); Korinthias: Arhea Nemea - mt Farmakos 1500 m and village Gimno 750 - 1000 m, 24.5.1970, Zambelis (ATH.); Attica, in mt. Gerania 1200 m, Tuntas (WU.-Herb. Halácsy); Attica, mt. Parnes, reg. abietina 1854, Orphanides (W.); Hab. in monte Ozia (Parnes) Atticae, 3000', 1953, Orphanides (WU.) ibid. reg. abietina. 8.6.1895, Heldrich (WU.); ibid. 3500 - 4000', Heldreich 113 (LD. W.); In m. Parenthos Atticae, reg. abietina pr. Hagia Triada, 27.9.1851, Heldreich 2112 (W.); Attiki, on the slope of Mt. Parnis, by the way to Aj. Trias, edge of fir-forest, ca. 1200 m, 1.5.1979, Boratyński, Browicz, Zieliński 38, 39 (ATH.KOR.); Achaia: prope pagum Aroania, inter montium Erymanthos et Chelmos, c 1000 m Phitos 11158 (UPA.); Arcadia: Montes Mainalon in reg. abietina supra Vitina versus Alonistiana, 1100 - 1400 m, 14.6.1958, Rechinger 20475 (W.); Argolida, ca 0.5 km E of Adamion, S of Epidaurus, way side thicket on the fields side, 10.9.1980, Boratyński, Browicz, Zieliński 864, 866 (ATH.KOR.); Arkadia: ca 11 km S of Tripoli, near road to Sparti, ca. 750 - 800 m, loose *Quercus coccifera* brushwood, 12.9.1980, Boratyński, Browicz, Zieliński 905, 906, 906a, (ATH.KOR.); Arkadia, ca 2 km E of road Tripoli to Sparti, near road to Agios Petros, thicket near road, 13.9.1980, Boratyński, Browicz, Zieliński 957 (ATH.KOR.); Arkadia, Lakonia, ca 3 km NW of Karyae, in direction to Agios Petros, ca 1000 m, 13.9.1980, Boratyński, Browicz, Zieliński 933 (ATH.KOR.); Parnon-Gebirge, Sattel E oberhalb Ajios Petros, ca 900 m. *Quercus*-Waldrand, 14 - 29.6.1979. Polatschek (W.); In monte Malevo prope Spilia, 4500', 6 - 18.1857, Orphanides 685 (LD, W, WU.); In monte Malevo Laconiae supra Monasterium Malevi, in loco dicto Lurida, 26.7.1850, Orphanides (WU.); In monte Malevo Laconiae prope Canalakia, 1850, Orphanides 2919 (WU.); S. Arkadia: E of Agios Ioannis, the thicket among single trees of *Juniperus drupacea*, 14.9.1980, Boratyński, Browicz, Zieliński 967 (ATH.KOR.); ibid., in the direction of Astros, thicket of *Juniperus drupacea*, 800 - 900 m, 13.9.1980, Boratyński, Browicz, Zieliński 949 (ATH.KOR.); S. Arkadia. ca 8 km S of Kosmas, thicket near road to Geraki, ca. 900 m, 16. 9.1980, Boratyński, Browicz, Zieliński 1003 (ATH.KOR.); S. Arkadia, ca 1 km E of Kosmas, 1100 - 1150 m the sparse fir-juniper wood, 16.9.1980, Boratyński, Browicz, Zieliński 1009 (ATH.KOR.); SW Ilia, between Nea Figalia and Petralona, among the rudimental scrub, ca 650 m, 25.9.1980, Boratyński, Browicz, Zieliński 1227, 1228 (ATH.KOR.); W. Mesinia. The Kiparisias Range, thicket above Rodia, ca 400 m, 24.9.1980, Boratyński, Browicz, Zieliński 1199 (ATH.KOR.); Mesinia, ca 31 km NE of Kalamata, 3 km past Artemisia, along the road to Sparti, wide *Pinus nigra* forests, 22.9. 1980, Boratyński, Browicz, Zieliński, 1150, 1151, 1152, 1153 (ATH.KOR.); SE Mesina. Taygetos Mt., E of Tseria, in the upper part of the dried mountain brook valley, 20.9.1980, Boratyński, Browicz, Zieliński 1118 (ATH.KOR.); Lakonia, Mt. Taigetos, NW of Arna (ca 25 km S of Sparti), 950 m, 22.5.1964, Runemark, Snogerup 20563 (LUND.); In Euboea septentrionalis: In mont. Xiron Oros, prope Hagia Anna, ca 700 m, 2.6.1955, Rechinger 16896 (W.).

Literature:

Athos (Rauh 1948; Byatt 1976); Mazedonien: prope Naussa (Diapulis 1933); Pieria: in m. Olimbos supra Eitohoro, 400 - 600 m (Byatt 1976); Olymp: ob. Litochori: Zeus-Wiesse, 950 m; ob Prioni 1250 - 1300 m Olymp: ob Litochori: Zeus-Wiesse, 950 m; ob Prioni, Wald 1250 - 1300 m (Strasser 1982); Pr. Godman, in mt. Olympo (Halácsy 1900); Macedonia: Grevena: montes Hasia (Byatt 1976); In subalpinis inter Chaliki et Kranina; in m. Baba supra Klinovo (Hausknecht 1893; Halácsy 1900; Byatt 1976); Thessalia: Koturi; Veletsina (Halácsy 1900); Akarnania: in oropedio Livadi supra Mytikas (Halácsy 1908); Tymphrystos: Kapellenhügel bei Karpension, ca 850 m; oberhalb Karpension 1080 m; Strasse ob Karpension gegen Tymphrostos, 1450 m (Strasser 1982); Pr. Phlamburo in mt. Oxia (Halácsy 1900); Fokis: in m. Giona pr. Melandrini, 700 m and „Goumiou” pr. Lidhoriki 800 m (Byatt 1976); Mt. Parnassus, pr. Arachova (Halácsy 1900; Voliotis 1976; Byatt 1976); In m. Parnasso, in planitie Livadhi 1200 - 1300 m (Byatt 1976); In monte Parnassi inter Gourna et Nachora (Diapulis 1933); Viota: in m. Panaia (Byatt 1976); Böötien: Helikon, trockene Abhänge zwischen Stewenikon und Kukura, ca 400 - 500 m (Rechinger 1936); Attiki: in m. Parnis, ad „Potami Goura” (Byatt 1976); Attica: Inter Tatoi et Agios Merkurios (Diapulis 1933); Mt. Gerania in istmo Corinthiaco (Halácsy 1912); Attiki: Montes Yerania 1100 m (Byatt 1976); Patras (Halácsy 1900); Achaia: Kalavrita, ad Mon. Ayia Lawra, 700 - 800 m; Kalavrita 1300 m; Kalavrita: pr. Mega Spileo, 600 - 900 m; and Korinthia: Trikala 1100 m (Byatt 1976); Argolis: pr. Nauplia (Halácsy 1900); Arkadia: supra Milli 700 m; Arkadia: inter Tripolis et Sparti and in m. Taiyetos, in jugo „Artemisia”; in m. Taiyetos pr. Tripi 400 m (Byatt, 1976); Parnon: Korykische Grotte (Korykion Andron) (Diapulis 1933); In reg. abietina inter Tripolitza (Diapulis 1933); Andros: Gipfel des Kuvaras 975 m (Rechinger 1943b); Euboea: mt. Dirphys (Halácsy 1900; Rechinger 1943a).

Bulgaria: Janevo near Melnik, 1923, Stojanov (Agricultural Institute, Plovdiv, Herbarium no 36284).

Jugoslavia: see Džekov (1974) *.

SUMMARY

Having reviewed numerous herbarium materials, own collections and field notes made in Greece as well the literature on the subject, the authors have prepared a point map of distribution of *C. heldreichii* and have clarified some inaccuracies in opinions on the subject. It appears that this hawthorn occurs in southern Yugoslavia (Macedonia - Serbia), in southwestern Bulgaria (rarely), almost throughout continental Greece and on two Greek islands, Euboea and Andros, and most probably also in central and southern Albania. It grows between 250 and 1500 (1550) m elevation, on open, isolated, hot, dry places, in various types of thickets and on edges of forests. On higher elevations it occurs also inside loose fir and pine forests. It has been erroneously reported from Crete *.

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* During our field investigations in Greece in 1986 and 1988 we found some new stands of this species: Euboea: Seta; ca 8 km N of Stavros; Kurkuli; above Galatsades; 1 km N of Kersea; Amelandae; Peloponnisos: between Ano Diakopto and Mega Spilaeon; Aetolia: between Agios Vlasios and Chuni; Palaeokastron NE of Karpension; between Rendina and Fourni, NE of Karpension; Chasia: between Fotinon and Deskati; C Makedonia: Archangellos; Between Fanos and axiopoulos.

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O geograficznym rozmieszczeniu Crataegus heldreichii Boiss.

Streszczenie

Na podstawie rewizji licznych materiałów zielnikowych, własnych zbiorów i terenowych spozrzeżeń w Grecji oraz danych z literatury autorzy opracowali punktową mapę rozmieszczenia *C. heldreichii* i wyjaśnili pewne niedokładności w dotychczasowych opiniach na ten temat. Jak się okazuje główny występunek w południowej Jugosławii (Macedonia, Serbia), w po-

łudniowo-zachodniej Bułgarii (b. rzadko), w całej niemal kontynentalnej Grecji oraz na dwóch greckich wyspach — Euboea i Andros, a przypuszczalnie również w środkowej i południowej Albanii. Rośnie on między 250 a 1500 (1550) m n.p.m., na otwartych, nasłonecznionych i nagrzanym, suchych miejscach, w różnego typu zaroślach oraz na pobrzeżach lasów, a na wyżej położonych stanowiskach nawet wewnątrz luźnych lasów jodłowych i sosnowych. Błędnie podawany był z Krety.

КАЗИМЕЖ БРОВИЧ, ЕЖИ ЗЕЛИНСКИ

*O geografическом размещении *Crataegus heldreichii* Boiss.*

Резюме

На основании пересмотра многочисленных гербарных материалов, собственных коллекций и полевых наблюдений в Греции, а также литературных данных авторами разработана точечная карта размещения *C. heldreichii* и выяснены некоторые неточности в существующих мнениях на этот счет. Как оказывается, этот вид растет в южной Югославии (Македония, Сербия), в юго-западной Болгарии (очень редко), почти по всей континентальной части Греции и на двух греческих островах — Эубея и Андрос, а предположительно также в центральной и южной Албании. Он произрастает между 250 и 1500 (1550) и над ур. моря, на открытых, освещенных солнцем прогретых и сухих местообитаниях, в различного вида зарослях а также по опушкам лесов, а на более высоких местообитаниях даже внутри низкополнотных пихтовых лесов. По ошибке его отмечали на острове Крит.