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Distribution of woody *Thymelaea* in the eastern Mediterranean region

Genus *Thymelaea* primarily includes small evergreen shrubs 10 - 100 cm tall, and a few annual or perennial herbs. The number of species has not been strictly determined yet, because of various treatment of some taxa and an insufficient knowledge of them. New species are still being described as for example *Th. gattefossei* H. K. Tan from Morocco (Tan, 1977). It is most commonly assumed that there are about 25 of them though Hutchinson (1968) claims that there are as many as 35.

Taking into consideration the geographical distribution of all taxa, it is possible to treat the genus *Thymelaea* as being typically Mediterranean. The majority of species is characterized by a small range and only *Th. passerina* (L.) Cosson et Germ. (annual plant) is distributed widely and covers with its range not only the Mediterranean region but also the whole of Central and southeastern Europe, the Caucasus, western Siberia, southwestern and Middle Asia, attaining in the east western China and Kashmir and in the north, in Poland a Latitude of 53° N (Webb, Ferguson, 1968).

In Europe there grow about 20 species of *Thymelaea*, of which 14 are endemites. The greatest concentration of species takes place in the western part of the Mediterranean, particularly in Spain — 18 species (Webb, Ferguson, 1968), Morocco — 12 species (Jahandiez, Maire, 1932) and Algeria — 8 species (Quezel, Santa, 1963). In the easterly direction the number of species declines rapidly and in the eastern Mediterranean and in southwestern Asia besides *Th. passerina* there occur only 5 species: *Th. pubescens* (L.) Meissn., *Th. mesopotamica* (C. Jeffrey) E. Peterson, *Th. aucheri* Meissn., *Th. hirsuta* (L.) Endl. and *Th. tartonraira* (L.) All. Only the last two are woody and compared with other shrubs of the genus *Thymelaea* are characterized by the largest, most extended ranges spanning both the eastern and western Mediterranean. I have described these ranges on the basis of herbarium collections and literature quoted at the end of this paper. For each species I have prepared point maps of distribution and compiled a list of stands.

1. *THYMELAEA HIRSUTA* (L.) ENDL.

A shrub 40 - 100 cm tall, but under favourable conditions taller. Freitag (1972) reports that in southeastern Spain it attains a height of 120 - 140 cm and according to Durand and Barratte (1910) and Boulos (1971) in North Africa (Cyrenaica) it can be as tall as 2 m.

This is a circum-Mediterranean species, which has after *Th. passerina* the largest range in the genus. Basically it is restricted in Europe, south-west Asia and North Africa to a coastal belt more or less 50 km wide. In southern Portugal and in Morocco it occurs also along the Atlantic coast. In Morocco it reaches far south to the mountains of Ifni (Emberger, Maire, 1941).

The general line map of distribution of *Th. hirsuta* has been drawn by Rikli (1943) and a point map but only for southeastern Spain by Freitag (1972). In this latter region the shrub appears usually up to about 100 m elevation, and the highest stand was found at 630 m. According to Rikli (1943), in southeastern Europe, on the Balkan peninsula *Th. hirsuta* grows almost throughout Bulgaria and in the north it attains eastern Romania and the Danube delta. This information, however, is not accurate since both in Bulgaria and in Romania *Th. hirsuta* does not grow at all and in the other parts of the peninsula it is known only from western Yugoslavia, Kvarnerić and Dalmatia (Hayek, 1927), southern Greece, Crete and the Aegean Islands (particularly the Cyclades and the Dodecanese). The presence of *Th. hirsuta* in European Turkey has been questioned (Webb, 1966; Webb, Ferguson, 1968), however, in the herbarium of Ankara University there exists a specimen collected by Noë above Büyükdere on the Black sea in mid-XIX century. Since then no one has found *Th. hirsuta* in this region, thus it has to be assumed that this stand is only of historical interest. At the same time this was the only stand of *Th. hirsuta* on the Black sea. Most probably the stand from northwestern Anatolia, from Troas, quoted by Rechiniger (1943) is also historical. Thus the most northerly modern stands of *Th. hirsuta* in this part of the range occur on Skiros Is. (Petamidis 973, in sched.) and on Psara Is. (Greuter 11014, in sched.). In southern Greece the majority of stands is to be found in province Attiki (Fig. 1).

In southwestern Asia *Th. hirsuta* occurs on Rhodos Is., in Anatolia, on Cyprus, in Lebanon, Israel and in Jordan. In Anatolia it was found on few stands along the southern coast, from the central part of the Resadiyel peninsula in province of Mugla, in the west, to Yumurtalik in province of Adana in the east, at elevations 0 - 80 m. On Cyprus *Th. hirsuta* grows primarily on the southern outskirts of the island, commonly around Larnaca and in the Limassol region. It has been reported also from the northwestern part of Cyprus from the Karpas peninsula.

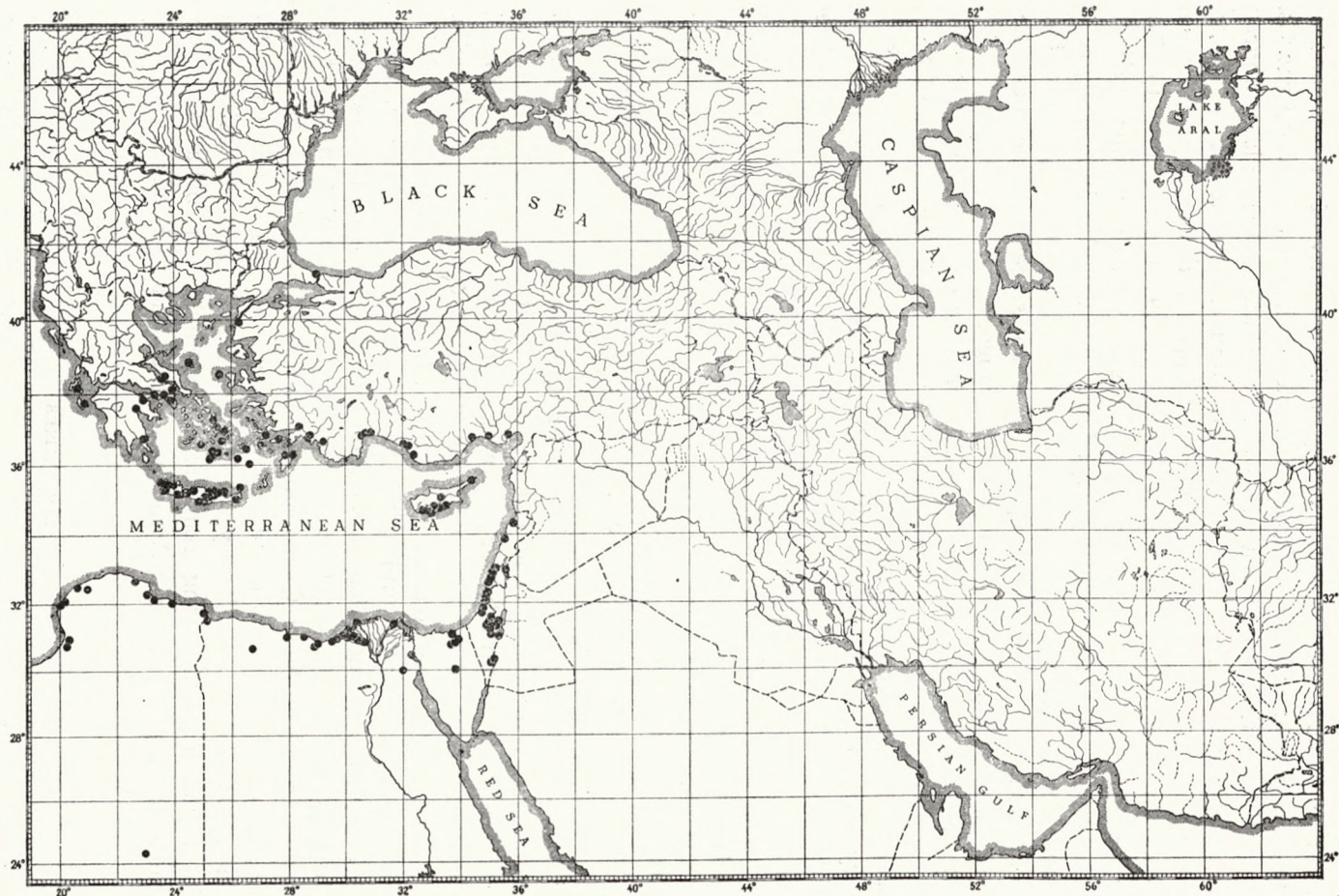


Fig. 1. Eastern part of the range of *Thymelaea hirsuta* (L.) Endl.

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In Syria *Th. hirsuta* is not known and in Lebanon it is very rare and it was being found in that country only in the vicinity of Tripolis and in Beirut. On the other hand in Israel it is one of the most common shrubs, both on the Mediterranean plains — Coastal Galilee, Acco Plain, Sharon Plain, Philistean Plain (Zohary, 1972) and in the desert — Negev and Judean Mts. The most elevated stands here have been reported from 500 - 600 m (Danin, Orshan, Zohary, 1975). According to Zohary (1972) in Jordan *Th. hirsuta* appears only in the western part of the country, in provinces Moav and Edom. Of particular interest here is the stand from district Maan (Wadi Musa road to Petra) positioned at an elevation of 1470 m (Kasapligil, 1956) since it is the most elevated stand of *Th. hirsuta* throughout its range.

In northeastern Africa *Th. hirsuta* is distributed primarily along the coast of Cyrenaica (from Ajedabaya in the west) and Egypt (till El'Arish in the east); as was reported by Täckholm (1974), in Egypt it is a very common shrub. Beyond the coast *Th. hirsuta* appears here also further inland on the Libyan desert and on the El Tih desert (in oases and oases). Boulos (1971) reports such stands from the far south of Cyrenaica, from Wadi Kufra (approx. 23°30'N) and Täckholm (1974) from Uweinat in Egypt.

Thus *Th. hirsuta* is a shrub of dry and hot places, steppes, semi-desert and desert, particularly in north Africa. In view of its very small soil requirements, xeromorphic scaly leaves (with curved — in margins and white tomentose underneath), a deep tap root about 150 cm long (Freitag, 1972), resistance to dust in the air and salt in the soil and also to extremely dry atmospheric and soil conditions it can occur on the most infertile and unfavourable for other woody plants conditions. Since it produces massive quantities of seeds (Freitag, 1972) it disperses easily forming both its own associations — *Thymelaetum hirsutae* (Rikli, 1943) and entering into other xerophytic, psammophytic and even semi-halophytic communities. In southeastern Spain these are associations from the class *Lygeo-Stipetalia* (Freitag, 1972), while in Egypt and in Israel from the class *Quercetalia calliprini* (order *Ballotetalia undulatae*), *Artemisietea herba-albae* and *Retametea retami* (Zohary, 1973; Danin, Orshan, Zohary, 1975). Besides *Th. hirsuta* easily enters ruderal communities along road-sides and fields. It behaves in this manner in Greece, northern Attiki along the road to Khalkis.

LOCALITIES

Greece. Herbarium specimens: Zante: Insel Peluso, 23.3.1936, Ronniger (W.); Peloponnisios: Lakonia, Monemvasia, 18.5.1970, Stamatiadou 8957 (ATH.); Attiki: Megaros, 24.3.1968, Stamatiadou 1706 (ATH.); Attica, 1850, ?(W.); Attika: In colle

Turkovuni prope Athens, 7.4.1927, Rechinger 43 (BM.); Imitos, 29.3.1938, Davis 58 (E.); Attica: In monte Lycabetto, 1867, J. Ball (E.); Lycabettos, 1894, Makowsky (W.); Below Mt. Imitos, 29.3. 1972, Burbridge 33 (E.); Kefalaria, Athens 16.4.1969, ?(ATH.); Prope Athenas vulgat., 1850, Orphanides 270 (BM. E); Athens: Ellinikon -near air port, 11.4.1978, Browicz G.42/78 (KOR.); Attiki: Anavissos, 28.2.1971, ? (ATH.); Attiki: Marathon, 9.3.1971 Stamatiadou (ATH.); Attiki: near road to Khal-kis, 21.3.1978, Browicz G.8/78 (KOR.); Euboea, prope Loto, Unger (W.); Island of Skiros, E of the village Hora, 50 m, 1.4.1977, Petamidis 20710 (ATH.); Insula Psara: in planitie „Alladhokambos” voc., 20 m, 19 - 25.4.1973, Greuter 11014 (ATH.); Delos — kleine Insel bei Mikra Delos, 1911, ? (W.); Cyclades: Ins. Glaronisi, 4.5.1934, Rechinger 5010 (W.); Santorini, by the sea, betw. Akrotirion and the excavation of the old city, 10 - 13.5.1970, ? (ATH.); Island of Makra near Casos (Dodecanese), 29.4.1950, Davis 18108 (K.); Cyclades: Saphrania (Zafrania) 27.5.1935, Rechinger 7634 (BM.); Cos — Castle Cardanera, sandy heath, 4.1960, Millward 70 (B.M.); Rhodos, Hedenborg (W.); Kriti: Insulae Dionysades. In saxosis cal. insul. Dragonara, 13.5.1942, Rechinger 12932 (BM. W.); ad Platania et sub. Galata distr. Khamistikas, 25.6.1893, Baldacci (BM.); Iraklion-Moires, 6.3.1968, Stamatiadou 1053 (ATH.); Nomos Iraklion: Chani Kolkini near Gouves, 6.4.1974, Cannon 4175 (BM.); Distr. Temenos: from Knossos to the hill Profitis Ilias, 100 - 200 m, 3.12.1971, Petamidis 20550 (ATH.); Distr. Pediada: In saxosis litoreis prope Chersonisos, 13.7.1942, Rechinger 14414 (W.); Distr. Kaenurio: Ambeluzos, 22.11.1943, Rechinger 15323 (W.); Ep. Pediado. Iraklio, O-Seite des Hügel Koprena an. d. Str. nach Ela'a, 150 m, 22.3.1961, Greuter 3311 (W.); Ep. Sfakia: prop. Aj. Andonios ad orient. pagi Vuvas, 250 m, 8.10.1966, Greuter 7692 (W.); Prov. Hania: distr. Kissamos. Island Gramboussa, 0 - 100 m. Barren stony, rocky calcareous ground with phrygana, on the coast, 25.7.1973, Stamatiadou 30848 (ATH.). Distr. Mirambello. N. of the village Skinias, place named Pirji, 100 - 200 m. Along a dry river bed. 25.4.1972, Petamidis 1220 (ATH.).

Literature: Cephalonia. pr Mantzavinata, Heldreich; Argolis; Corinthus: (Hálá-csy, 1904); Attika, Athen. Akropolis und Philopappos, ca. 150 m, 14.5.1967 (Merx-müller, Podlech, 1967); Euboea: Chalkis, Adamov (Rechinger, 1961); Cyclades: Megalorheumatari; Naxos; Anhydros; Kleine Insel bei Kato-Kuphonisi; Dyo Adelphi, kleinere Insel; Stakides (Rechinger, 1943a); Nisiros: Pyrgos, Kandelousa (Papatsou, 1975); Santorin: Thera, Therasia, Palaea Kaimeni, Askani, Christiani (Hansen, 1971); Ins. Pholegandros (Hálácsy, 1908); Rhodos: Calitea, Soroni an der Strasse nach Campochiaro (Finkl, 1961 - 62) M. San Stefano; zwischen Mon. Tris and Misci (Re-chinger, 1943a). Kriti: Temenos: Knossos; Pedeada (Rechinger, 1943b); Kissamos: Kolymbari, Kastelli, Polyrrhenia; Khania: Hag. Marina; Sphakia: Komitades, Hag. Joannis; Rethymno: Khamalevre, Arkadi, Rethymno; Malevyzi: Daphnas, Krusonas; Pyrgiotissa: Hag. Triada, Phaestos; Kaenurio: Hag. Deka, Gortys; Kandia; Pedeada: Angarathe, Boni; Sitia: Insel Yanisada; Kalathenes; Hag. Georgios (Rechinger, 1943a).

Cyprus. Herbarium specimens: In maritimis ubique, 8.4.1859, Kotschy 452 (W.); Pervolia marshe (Larnaca), up to 200', 26.2.1938, Syngrossides 1749 (K.); Betw. Lar-naca and Pervolia. In saline field, 15.1.1934, Syngrossides 495 (K.). SW of Lar-naca, 5', 14.4.1967, Merton 361 (K.); Larnaca. Aerodrome. In grass steppe, locally common, 13.4.1950, Chapman 420 (K.); Distr. Larnaca, salt lake, 18.7.1973, Laukko-nen 58 (K.); Nr. Mazotos, 100', not far from the sea, 24.2.1954, Merton 2854 (K.); Limassol salt lake of Cape Gata, common, with *Juniperus phoenicea* and *Cistus monspeliensis*, 22.5.1941, Davis 3545 (E. K.); Cape Gata, sea level on dry sandy bank, 9.5.1962, Meikle 2913 (K.); Ad ruinas, Carium. 9.3.1937, Uscher (K.); Limassol-Paphos road, 100', only found near S sea shore, 23.3.1933, Chapman 346 (K.); Ko-lossi, 4.1961, Polunin 6676 (K.); Akrotiri, 22.1.1966, near salt lake, 18.3.1966, Matthews

9 (K.); Messoria, salt marshes near the sea, 1950, Probyn (K.); Nicosia, 1931, Rogers 5453 (K.); Karpaus, 1937, Roger-Smith (K.).

Literature: Epsikopi, in *marginatae viae* (Lindberg, 1946).

Turkey. Herbarium specimens: Constantinopol, oberhalb Büyükdere, Ufer d. Schwarz. Meer, Noë (ANK.); Mugla: Marmaris — Datca yolu, 23.4.1969, Walter 8012 (EGE.); von Köycegiz nach Mugla, vor Mugla, 11.5.1955, Walter 370 (B.); Mugla: Köycegiz — Dalaman çayı köprü, 11.5.1967, Peşmen et al. 4673 (EGE.); Mugla: Fethiye, 12.3.1968, Meyer et al. 2557 (EGE.); Dalaman, Meerküste, 8.6.1955, Walter 285, 286 (E.); 6 km W of Antalya, 10 m, 25.1.1936, Tengwall 69 (K.); Antalya, 15.10.1960, Kayacik 2882 (ISTO.); Antalya, 10', 16.6.1958, P.B.S. (K.); Antalya: Lara, ca. 10 km SE of Antalya, 15 m., 8.4.1959, Hennipman 187 (K.); Antalya: Lara yolu üzeri, 4.8.1965, A.Baytop 8235 (ISTE.); Alanya, 5 km bati, ca. 80 m, 17.6.1966, Oguz (EGE.); Alanya, südstrand, 9.4.1955, Walter 3804, 3813 (B.); Alanya'nin 7 km, 31.12.1973, A. et T. Baytop (ISTE.); Alanya — Anamur, 8.1.1966, Başoglu et al. 4667 (EGE.); Tarsus: Baharli, 1955, ? (ANK.); Viransehir, kumluk sahil (Mersin), 19.5.1969, A. Baytop, Çubukçu 15092 (ISTE.); Prov. Seyhan, 2 km W of Yumurtalik, 35 km S of Çeyhan, 0 - 5 m, 14.9.1956, Mc. Neill 817 (E.K.).

Literature: Troas, Webb (Rechinger 1943a).

Lebanon. Herbarium specimens: Beyrouth, sea cliff, 25.3.1933, Meinertzhagen (BM.); Beirut, sea shore, 12.5.1878, Post 1035 (BM.); Ad Beyrutum in arenosis maritimis ad Ras Beirut, 4, 8.5.1910, Bornmüller 12326 (B.); Area S of Ras Beirut, 10 - 15 m, 21.1.1955, Halbaek 59a (K.).

Literature: Tripoli (Mouterde, 1970).

Israel. Herbarium specimens: Near Acre on the beach, 1864, Lowne (K.); Akka, 1870, Herb. Post (E.); Hadera, dunes 30.2.1945, Hardy (BM.); Jaffa, 1870, ? (E.); Jaffa, 1861 ? (K.); ad Jaffa, 4.1897, Bornmüller 1405 (B.); Küste zw. Jaffa u. Haifa, 15.5.1930, Amsel (B.); Ramath-Gan, near Tel-Aviv, sandstone hills, 28.11.1927, Feinbrun et Zohary 75 (B. BM. E. W.); „Kurkare" near Ramat Dan, 3.1943, Krupko (WA.); Beersheba, 1864, Lowne (BM. K.); Beersheba, 1942, Davis 4961 (E.); Beersheba to Abou Horari, Hart (BM.); Negev Desert, ca. 10 km from turn off on' Arad-Dead Sea road to Sidi Baker, 24.3.1970, Melville 7015 (K.).

Literature: Phoenicia: ad pagum Ekzib dit. Akka, intersepes (Nábělek, 1929); Mt. Carmel; Hula Plain (Zohary, 1972); Athlit; Dhahiriyyat to Hebron; Hafir; Bir-ul-Abid (Post, Dinsmore, 1932); Sharon Plain, n. Herzliya; sandy, calcareous hills near Gan Yavne; S fringe of the Judean Mts. facing to Negev, 11 km S of Dahariyeh; N. Negev, env. of Kefar Yeroham, ca. 600 m; coastal belt, hills near Rehovot (Zohary, 1973); Sandy plain of Tureiba (Meishor Yemin) of the Central Negev (Zohary, 1962); Saron: Burj, 3.1.1916, Aaronshon 6149 (Oppenheimer, Evenari, 1940); Low hills N. and S. of Be'er Sheva, 180 - 350 m; 'Arad Plain and the Dimona Hills, 400 - 600 m; S. and E. Judean Hills, 500 - 600 m; near Lahav, 400 - 600 m (Danin et al., 1975); Khirbat el Batt, hills northeast of Tel Milh; east of Qurnub, south-east of Beersheba (Zohary, 1951).

Jordan. Herbarium specimens: Petra, on the plateau, 1 km N of the rest house 29.1.1976, Boulos 8345 (KOR.); Petra, 1000 m, 1909, Meyers, Dinsmore 3335 (E.); Wadi Petra, 23.3.1973, Boulos 5475 (BM.); Petra, 15.3.1974, Boulos et al. 6241 (BM.); Hor a. Petra, 1883 - 84, Hart (BM.); Petra, 1200 - 1500 m, Wild rocky ravins, heavily grazed, 28.3.1976, Swann 2 (BM.); Petra, 900 m (30°19' N, 35°26' E) An open *Juniperus phoenicea* forest with *Pistacia*, *Daphne linearifolia* and *Thymelaea hirsuta*, 1963, Gillett 15871 (K.).

Literature: Moav (Zohary, 1972); Dead-Sea (Post, Dinsmore, 1932); Mont Hor, pres de Petra; Petra, pres du theatre (Oppenheimer, 1931); Maan distr., Wadi Musa road to Petra, ca. 1470 m, 18.12.1954, Kasapliligil 1807 (Kasapliligil, 1956).

Egypt. Herbarium specimens: Wady el Arsih, near the sea, 25.12.1923, Simpson 2244 (K.); Desert Tih, 2 days N of Nakl, 21.3.1882, Post 73 (W.); 30 m S of El Arish — desert, 1500', Meinertzhagen (BM.); Wüste zwischen Cairo u. Suez, 1855, ? (W.); Alexandria: Sidi-Gaber, 22.3.1906, Petry (B.); Alexandria, desert, 1830, Herb. Belanger (W.); 76 km S. of. Alexandria, 1939, ? (K.); juxta Ramleh, prope Alexandria, 23.3.1877, Ball (E.); Near sea at Ramleh, Scott Elliot 3549 (E.); Near Alexandria: Ramleh, 1875, Hurst (BM. K.); Common inter Alexandria et Ramleh, 15.3.1871, Parquet (BM.); Ramleh, 4.1886, Post (BM.); near Ramleh, 1919, Ogilvie (K.); Burg el-Arab, 1944, Davis 6394 (E.); *ibid.*, 1938, Soliman (K.); Bourg el-Arab to Abushir, 1922, Simpson 460 (K.); Ramleh bei Alexandria, 24.3.1902, Kneucker 277 (B.); Inter Ramleh et Abukir, prope El-Mandara, 11.4.1908, Bornmüller 10952 (B.); Abukir, 1861, ? (K.); Alexandria, in collibus deserti ad occasum lacus Mareotici prope stationem Amria, 13.4.1908, Bornmüller 10953 (B.); Rocks near the Shalakhian, Mex, 23.11.1926, Simpson 4162 (K.); El Omaied, sandstone, 21.9.1930, Gauba 259 (W.); Near Mairut, 1.12.1916, Walsingham (K.); Deir el Gitani, SW of Alamein, 1928, Murrey (BM.); El Dabaa, maritime desert, 1.1928, Meinertzhagen (BM.); Sollum, 1963, Täckholm et al. (K.).

Literature: Gebel El-Maghara, W. El' Arousiya, in sand and between stones (Boulos, 1960); Mandara; Abukir; Rosetta; Damietta; Libyan Desert: Bir Abu Dafn near Ismailia (Muschler, 1912); Environs of Mairut; 52 km SE of Alexandria; Between Cairo and Alexandria; ca. 10-20 km from Alexandria (Zohary, 1973); Between Daba and Marsa Matruh; Chorab pass, Istablroute to Siwa Oasis (Rikli, 1943); The Oases of the Libyan Desert (Uweinat) (Täckholm, 1974).

Libya (Cyrenaica). Herbarium specimens: Cyrenaica — Salzsand nahe der Küste, 4.1941, Holzapfel (B.); Porto Bardia, 1926, Krueger (K.); Tobruk, 29.5.1956, Hiliter 46 (BM.); 70 km W of Tobruk, open stony desert, almost s. l., 22.2.1966, Archibald 976 (K. W.); Ras el Hilal district, nr. Derna, 1952-56, Britton 63 (BM.); Bu Gassal a sud-est di Barce, 29.3.1933, Pampanini 5346 (BM.); Coastal salty plain nr. Tokra, 5.1921, ? (BM.); 6 miles SE of Agedabia, characteristic of coastal zone, s. l., 3. 10. 1951, Gimmingham 111 (K.); Tra Agdeabia e Artelat a Bag Lia, 10.4.1934, Pampanini, Pichi-Sermolli 5352 (W.); On coast, at Sidî Marus, 1948, Robbie 1 (K.); U. el-Atrun, 14.5.1934, Pampanini, Pichi-Sermolli 5355 (K.).

Literature: Benghazi; Benié; Golfe de Bomba: Kos Ghazda, dans les sables du littoral; Tobruk, partie septentrionale du golfe ou il formes arbrisseaux; Badia (Durand, Barratte, 1910); In Kufra Oasis (Boulos, 1971).

2. THYMELAEAE TARTONRAIRA (L.) ALL.

A shrub up to 50 cm tall, much ramified, usually with erect shoots and a characteristic semi-globular habit. In contrast to the previous species it does not occur in northeast Africa and in southwest Asia it is known only from Cyprus, southwestern and western Anatolia and from of the neighbouring islands. Also in Mediterranean Europe the range of *Th. tartonraira* is restricted only to Spain, France (very rare, in the vicinity of



Fig. 2. Eastern part of the range of *Thymelaea tartonraira* (L.) All.

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Marseilles and Toulon), Italy, Corsica, Sardinia, Sicily, Greece, Crete, the Aegean islands and European Turkey. Almost throughout its range the shrub appears only in coastal regions and only in northwest Africa, in Morocco and Algeria it occurs inland, in the mountains of Moyen Atlas, Atlas Saharien and Hautes Plateaux. It is also here in Morocco where the most elevated stand is to be found at 1800 m (Jahandiez, Maire, 1932).

In the eastern Mediterranean region (Fig. 2) *Th. tartonraira* has its most northerly stands in the southwestern part of Thasos island (Stojanov, Kitinov, 1950) and in the southern tip of Gallipoli peninsula. It grows most commonly and most abundantly in the Aegean region, in Greece in the Attiki province, on the Euboea, in western Crete, on the Cyclades and on the Dodecanese islands, and in southwestern Anatolia in provinces of Izmir, Aydin and Mugla. It appears in xerothermic, coastal thickets of the maquis and garigue type, on stony, rocky (calcareous and serpentine), dry and sunny slopes and in sparse pine forests of *Pinus brutia* Ten. in Anatolia and *P. halepensis* Mill. in Greece.

In its vertical distribution *Th. tartonraira* is occurring in Anatolia between 10 and 300 m elevation, however, in places it reaches much higher elevations beyond 500 m and even at 800 - 900 m (Samsun Dagi). On the Aegean islands (Samos) it grows to an elevation of 700 m, on Euboea up to 800 m, on Crete up to 900 m and in Attiki usually below 500 m but on Mt. Parnis up to 950 - 1100 m (Merxmüller, Podlech, 1967).

Th. tartonraira is a polymorphic shrub and its variability is manifest primarily in the leaf width and its pubescence. Forms are known which have very narrow (1 - 3 mm) and elongated leaves thickly silver sericeous, reported primarily from Crete, but known also from Rhodos, Cyprus and southern Anatolia. They have been separated sometimes into an independent species *Th. argentea* Sibth. et Sm., or into variety *Th. tartonraira* β *angustifolia* Cuv.

Recently Webb and Ferguson (1968) have divided *Th. tartonraira* into three subspecies: 1. subsp. *tartonraira* which is said to occur throughout the range of the species except Crete, 2. subsp. *argentea* (Sibth. et Sm.) Holmboe which is to be a Cretean endemite (but is it really?), 3. subsp. *thomassi* (Duby) Briq. endemic for Corsica and characterized by glabrous shoots and leaves. Besides Reehinger (1961) mentions from Euboea apart from the type variety also var. *candiliana* Beauv., and Jahandiez and Maire (1932) from Morocco a var. *genuina* Lange.

The extent of variability or stability of morphological characters as well as the geographic range of various forms of *Th. tartonraira* is not known accurately yet. It was already pointed out (Aymonin, 1971) that similar tendencies for the appearance of various forms are observable

in different, frequently very far removed regions, which means that further studies are necessary, both on regional and rangewides basis. In the present study when preparing the point map of *Th. tartonraira* distribution the species is treated in the broad sence without differentiating into subspecies or varieties.

LOCALITIES

Greece. Herbarium specimens: Cephalonia. Assos, seen only in the peninsula, 21.1.1940, Davis 1129 (E.); Isthme de Corinthe, 1899, ? (W.); Attica: in planitieae Eleusinia, ad radices m. Corydali, 27.3.1884, Heldreich (W.); M. Kerata sup. Eleusini, 5.1885, Haussknecht (BM.); Attika, Parnis, 3.1931, Guiol 1733 (BM.); ad radices m. Parnetto, 800 - 1500', 1878, Heldreich 435 (W.); Athen, in collibus, 15.4.1883, Heldreich (B.); *ibid.* 1894, Makowsky (W.); Loc. incult. pr. Athen, 5.1876, Pichler (BM.); In monte Hymettos prope Athenas, 6.10.1886, Bornmüller 3488 (B.); *ibid.* 25.3.1968, Stamatiadou 2004 (ATH.); *ibid.* 21.3.1854, Heldreich (W.); *ibid.*, 1000 - 1500', 29.3.1938, Davis 58 (BM.); In monte Pentelicon prope Athenas, 29.10.1886, Bornmüller 3488 bis (B.); *ibid.*, Unger (W.); *ibid.* 4.5.1890, Walker 809 (BM.); Kiphissia, 1890, Walker 889 (BM.); *ibid.* 1.4.1978, Browicz G.13/78 (KOR); Attica: Anavissos, 28.2.1971, ? (ATH.); Attica: Dionysos, 27.2.1971, ? (ATH.); Prov. et distr. Attiki, in collibus inter Kapandhriti et Kalamos, 2.4.1972, Greuter 9817 (ATH.); Attika: östl. Vouliagmeni, an der Strasse Athen-Kap Sounion, 20 m, sub. litoralen phrygana, 23.3.1962, Greuter 4024 (W.); Euboea: Achmet-Aga — Psachna, 3.1969, Stamatiadou 6458 (ATH.); Euboea sept. Montes Kandili. In jugo Hagios inter Psachna et Achmet-Aga, 550 m, substr. serpent., 20.8.1956, Rechinger 16429, 18207 (W.); Euboea centr. In pinetis inter Nea Artaki et Pisonas, substr. serpent., 27.6.1958, Rechinger 19119 (W.); Euboea. Common throughout western Euboea, Pappadhes c. 300 - 800', 11.4.1962, Money-Coutts (BM.); Chios: near pass to Nea Moni, 1600', 22.5.1963, Gathorne-Hardy 467 (E.); Chios, 8.3.1969, Stamatiadou 4473 (ATH.); *ibid.*, Aucher-Eloy 2819 (BM.); *ibid.*, Rechinger 5401 (BM.); Chios: Acropolis et Emborio, 24.5.1963, Gathorne-Hardy 467 (E.); Chios, 8.3.1969, Stamatiadou 4473 (ATH.); *ibid.*, Aucher-Eloy 2819 302 (B.); Samos: Apo Maratokampos, 700', 25.2.1970, Stamatiadou 7435 (ATH.); Kos: Kephalos, 100 m, 28.3.1965, Davis 40508 (ATH. E.); Kos, Rechinger 7968 (BM.); Kalymnos, Forsyth Major 349 (E.); Siphnos: Slopes of Mt. Prophetis, 500 m, 26.6.1961, Gathorne-Hardy 86 (ATH. E.); Rodi: coll. presso Triada, 2.1914, Vaccari (K.); Rhodos, above sea cliffs beyond Acropolis. On bare, stony ground, 18.4.1971, Townsend 71/46 (K.); Rhodos: NE of settlement of Kritika, 50 - 100 m, 3.4.1973, Stamatiadou 16476 (ATH.); Rhodos: coll. incult. pres Bastidia, 27.5.1870, Bourgeau 143 (BM. E.); Insula Rhodos, 1854, Pittoni (W.); Kriti: Mt. Amalos, 24.5.1884, Reverchon 155 (W.); Kriti: Mt. de Lakous, 20.6.1883, Reverchon 155 (B. W.); W. Kriti: Palaiochora, 27.4.1938, Davis 116 (BM.); Kissamos/Selinos. Küste östl. der Insel Elafonisos, 1 - 2 m, 1962, Greuter 4660 (W.).

Literature: Cephalonia: Attica pr. Charakas; Laconia, in valle fl Eurotas; Isthmus Corint; Attika pr. Marussi; Ins. Salamis (Hálácsy, 1904); Parnis. Hagia Trias, bei 950 - 1100 m (Merxmüller, Podlech, 1967); Euboea: Pass Kandili, 800 m (Rechinger, 1961); H. I. Kassandra: M. Hag. Elias, 300 m (Rechinger, 1943a); Tasos: between Limenari and Maries, 50 - 60 m, maquis (Stojanov, Kitanov, 1950); N. Sporades: Skopelos (Rechinger, 1943a; Phitos, 1967); Mytilene; Samos: Vathy, M. Ambelos 700 m, Kolonna, M. Kerki; Tenos; Delos; Paros; Naxos, M. Phanariotissa

bei Aprianthos; Schinusa und Kato-Kuphonisi; Melos; Anaphi: Kalamos; Astypalaä; Saphrania (Rechinger, 1943a); Giali (Yiali) (Papatsou, 1975); Rhodos: Koskino; M. Smith, San Stefano (Rechinger, 1943a); Rhodos: Calitea (Finkl, 1961-62); Kriti: Chania. Kalkfelsen zwischen Lakki und der Omalos-Ebene, zirca 900 m (Rechinger, 1943b); Kriti: Environ de Spahkia (Zaffran, 1976); Sphakia: Hag. Rumeli, Komitades, Ai Katerini, Hag. Paulos; Selino: Omalos; Apokorono: M. Hag. Pneuma, Phre; Hag. Vasilis: Ardaktos, Weg von Spili zum M. Kedros (Rechinger, 1943b).

Cyprus. Herbarium specimens: Beside village, road to Lefkara, common, 22.9.1936, Foggie 384 (E.); Near Lefkara, 12.8.1898, Post (BM.); In mt. prope Kantara, 7.4.1880, Sintenis et Rego 10 (BM. W.); Akanthou, 500 - 1000', 10.11.1940, Davis 2029 (E.); Between Lefkara a. Vavatsinia, 18.3.1941, Davis 2734 (E.); Between Komi Kebir, 300 - 1000', 28.2.1941, Davis 2452 (E.).

Literature: Mazoto (Holmboe, 1914); In campo lapidoso siccissimo juxta viam ad Staurovouni (Lindberg, 1946); between Nicosia and Limassol (Zohary, 1973); common in maquis in the lower regions, particularly on sedimentary formations in the northern range and Limassol District (Chapman, 1949).

Turkey. Herbarium specimens: Çanakkale: Eceabat, 16.5.1962, Regel (EGE); ibid. 8.1968, Öner 17982 (ISTO.); Çanakkale: Kilitbahir, 9.11.1968, A. Baytop, Çubukça 14765 (ISTE.); Çanakkale: Ariburun, 29.4.1968, A. et T. Baytop 12614 (ISTE.); Dardanelles, 1890, ? (W.); Renkoei, 11.4.1883, Sintenis 267 (BM. E.); Plains of Troy. Tomb of Ajax, Clarke (BM.); Çanakkale: SSW Çanakkale, 2 km S Güzelyali, 27.3.1974, Lewejohann, Holtz (E.); Izmir: Mordogan yolu, macchia, 1.11.1966, Peşmen (EGE.); ibid. 22.4.1962, Regel (EGE.); Izmir: Inter Urla et Mordogan, 22.1.1962, Regel (EGE.); Izmir: N of Urla, near village Özbek, 9.11.1977, Browicz et al. 58 (KOR.); Izmir: Çesme to Şifme, 30 m, 26.4.1965, Davis 41856 (E); Çesme, Turtes, 21.6.1972, Ömer 10376 (EGE.); Çesme: Balıkklova-Ildir arasi, 7.3.1965, Peşmen 317 (EGE.); Izmir: grassy places among shrubs at Ilica, 3 km E of Çesme, 28.5.1966, Alava 4824 (E.); Izmir: Seferihisar — Akkom, 27.2.1967, Peşmen, 4670 (EGE.); Ile de Chustan (Macronisi), pres de Vourla dans la golfe de Smyrne, 2.5.1854, Balansa, 373 (BM. E. W.); Aydin: Söke. Ortaklar-Çamlık arasi, 300 m, 12.5.1967, Peşmen 8008 (EGE.); Aydin: Dilek, 150 - 900 m, Uslu 3271, 3954, 4174, 5553 (ANK.); Izmir: Samsun Dag above Güzelcamli, 800 m, 25.4.1965, Davis 41727 (E.); Izmir: Kusadası, Samsundag, 9.5.1965, Kayacık, Yaltirik 3762 (E. ISTO.); ibid. 27.11.1967, Peşmen 4672 (EGE.); Aydin: Didyma, 10 m, 9.4.1965, Davis 40776 (E. K.); ibid. 10.4.1972, A. et T. Baytop 19198 (EGE.); ibid. 17.10.1976, Pukacki (KOR.); Mugla: Milas-Tuzabat köyü, 1966, Peşmen 5007 (EGE.); Mugla: Datça, macchia, 19.7.1966, Peşmen 1615 (EGE.); Marmaris-Emecik, 200 m, 25.3.1956, Davis, Polunin 25326 (BM. E.); Köycegiz, 11.4.1962, Regel 92 (EGE.); Macchie bei Kemer: Fethiye-Inçaliler, 10.6.1955, Weber 308 (B.); Mugla: distr. Fethiye. Xanthus — Kestep, 100 m, 31.3.1956, Davis, Polunin 25531 (BM. E.); Xanthos, Forbes (K.); Mugla: Esen — Kalkan (Kalkan 24 km), *Pinus* forest, 100 m, 21.3.1977, T. Baytop 36544 (ISTE.); Antalya: Thermessus Milli Park, 200 m, 10.9.1976, Güven 17217 (ISTO.); In collibus ad Chaire prope Adalia, 27.4.1860, Bourgeau 242 (E. K.); Antalya kuzeyi, 27.1.1966, Regel (EGE.); Antalya: Düzlercamı, 250 - 300 m, 26.10.1964, Turan 4506 (ISTO.); ibid., 14.4.1964, Jackson 50004 (E.); Antalya: Inekthane yolu, 1956, Birand, 18 (ANK.).

Literature: Gallipoli penins. N of Eceabat (Webb, 1966); Kilia; Troas: Umgebung des In Tepeh; Hag. Demetrios Tepeh (Rechinger, 1943a); Ad Smyrnam (Bornmüller, 1908).

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KAZIMIERZ BROWICZ

*Geograficzne rozmieszczenie krzewów z rodzaju
Thymelaea we wschodnim Śródziemnomorzu*

Streszczenie

Rodzaj *Thymelaea* liczy około 25-35 gatunków, których zasięgi przypadają głównie na obszar Śródziemnomorza. Największa koncentracja gatunków zaznacza się w Hiszpanii [18], Maroko [12] i Algierii [8]. We wschodniej części Śródziemnomorza oraz w południowo-zachodniej Azji występuje już tylko 5 gatunków — dwa z nich to zimozielone krzewy o wysokości 50-100 cm. Na podstawie zbiorów zielnikowych oraz danych z literatury autor opracował mapy rozmieszczenia tych właśnie krzewów, lecz jedynie dla wschodniej części zasięgu (od 20° dł. geogr. wschod.).

Pierwszy z nich, *Th. hirsuta*, jest gatunkiem ogólnóśródziemnomorskim. Rośnie przede wszystkim wzdłuż wybrzeży morskich, zwykle na nizinnych, piaszczystych, wybitnie suchych terenach, w zbiorowiskach stepowych, półpustynnych i pustynnych. Jego najwyżej położone stanowiska znajdują się na pustyni Negev w Izraelu (do 600 m n.p.m.) oraz w południowo-zachodniej Jordanii, koło Petra (1470 m).

Drugi gatunek *Th. tartonraira*, nie jest już znany w północno-wschodniej Afryce, a w południowo-zachodniej Azji występuje jedynie na Cyprze i w Anatolii, ponadto na Wyspach Egejskich, na Krecie i w południowej Grecji, a także w europejskiej Turcji. W odróżnieniu od *Th. hirsuta* pojawia się on przede wszystkim na kamienistych i skalistych zboczach, w zbiorowiskach typu makia i garig, w Anatolii do wysokości 900 m n.p.m., a w Grecji do 1100 m.

КАЗИМЕЖ БРОВИЧ

*Географическое размещение кустарников из рода Thymelaea
в восточном Средиземноморье*

Резюме

Род *Thymelaea* насчитывает около 25-35 видов, ареалы которых приходится главным образом на территорию Средиземноморья. Самая большая концентрация видов выступает в Испании [18], Марокко [12], Алжире [8]. В восточной части Средиземноморья и в юго-западной Азии встречается уже только 5 видов — два из них это вечнозеленые кустарники высотой в 50-100 см. На основании гербарных материалов и литературных данных автор разработал точечные карты размещения этих кустарников для восточной части ареала (с 20° вост. геогр. долготы).

Первый из них, *Th. hirsuta*, является видом, распространенным во всем Средиземноморье. Он растет прежде всего вдоль морских берегов, обычно на низменных, песчаных, исключительно сухих территориях, в степных, полупустынных и пустынных ассоциациях. Его самые высокие местообитания находятся в пустыне Негеф в Израэле (до 600 м над ур. м.) и в юго-западной Иордании, около Петра (1470 м).

Второй вид, *Th. tartonraira*, уже не известен в северо-восточной Африке, а в юго-западной Азии встречается лишь на Кипре и в Анатолии, а кроме того на островах Эгейского моря, на Крите и в южной Греции, а также в европейской части Турции. В отличие от *Th. hirsuta* он появляется прежде всего на каменистых и скалистых склонах в ассоциациях типа маккия и гаррига, в Анатолии до высоты 900 м над ур.м., а в Греции до 1100 м.