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Distribution of species from the genus *Rhus* L. in the eastern Mediterranean region and in southwestern Asia

In the Mediterranean region there occur 3 species from the genus *Rhus* L., namely *Rhus coriaria* L., *R. pentaphylla* (Jacq.) Desf. and *R. tripartita* (Ucria) Grande. While the first one is widely scattered the latter two, originating primarily from North Africa are rather rare or even very rare in southern Europe and southwestern Asia. In Europe they grow only in Sicilia (Tutin, 1968). In southwestern Asia *R. pentaphylla* is reported exclusively from northwestern Israel, from rocky shores of Coastal Galilee and the Acco Plain (Zohary, 1972). On the other hand *R. tripartita* has more stands here and the drawing of its range in the region under discussion is possible though not very accurately.

Besides the species mentioned above, there occur four species more in the most eastern part of southwestern Asia, in eastern Pakistan, namely: *Rhus chinensis* Miller, *R. mysurensis* Heyne ex Wight et Arn., *R. punjabensis* Stewart ex Brandis and *R. succedana* L. (Stewart, 1972). However, data on these stands are so incomplete, that on their basis a description of range maps, even very approximate ones, is impossible. In view of the above only ranges of two species are discussed here — *R. coriaria* and *R. tripartita*.

1. *RHUS CORIARIA* L.

An erect shrub with quite thick, scarcely ramified shoots attaining a height of 2 - 4 m, and rarely more. Even taller ones have been reported from Uzbekistan, from the basin of river Tupalanga (Zaprjagajeva, 1964), where *R. coriaria* attains even 6 - 8 m with a stem diameter of 15 - 20 cm. This is a clearly helio-, thermo- and xerophilous species, which grows as a rule on exposed well insolated sites. It does not appear to be associated with any particular geological substratum, it appears, however, most commonly on soils of the rendzina type, and also on calcareous rocks. Thanks to the capacity to produce root suckers which form either as a result of mechanical injuries of roots or due to their exposure from

the soil, *R. coriaria* forms larger or smaller clumps. Usually these are pure thickets, or mixed ones with the participation of xerothermic shrubs that are component of shiblyak or maquis. More rarely the sumach can be found on forest edges or in very sparse oak or pine forests. Thickets of *R. coriaria* though often quite dense are always full of light as a result of the characteristic positioning of pinnate leaves on the distal parts of shoots, and thus under them herbaceous vegetation occurs. Root suckers attain 1 m in height in the first year, and shrubs can be as old 50 - 60 years.

In spite of the considerable range of *R. coriaria* it does not appear to have any greater morphological variability. In Europe, in the central part of the range, several varieties have been recognized the systematic value of which has not been sufficiently well studied yet. These are var. *humilior* Pojero (= var. *microphylla* Strobl) from Sicilia (Fiori, 1925) and var. *maritima* Bald. with var. *graeca* Regel from Jugoslavia, Albania and Greece (Rohlena 1941 - 42; Regel, 1942). All of these as can be judged from the available data are characterized by poorer growth and smaller, strongly pubescent leaflets. Several further forms have been described in 1955 from the Caucasus by Prilipko (after Grossheim, 1962) — f. *atroviridis* Prilipko, f. *cuneato-lanceolata* Prilipko, f. *coriacea* Prilipko and f. *microphylla* Prilipko. Possibly that last mentioned form corresponds to the small leaved European varieties.

This shrub is characterized by valuable technological properties — it supplies tannins and dyes and is used in folk medicine. These properties were known since antiquity. They have been mentioned among others by Solon in the 6th c.B.C. and also by Theophrast and Celsus (Hehn, 1894; Zaprzajagajeva, 1964). As Sokolov (1958) reports leaves and young shoots of *R. coriaria* contain up to 33% of all the tannins used in the tanning of various hides. As a result this shrub has been cultivated in special plantations established for example by the Arabs already in the VIIIth.c. in Spain. Exceptionally extensively *R. coriaria* has been cultivated in Sicilia, where towards the XIXth c. it was being exported from there for 17 million lira (Hehn, l.c.). In the USSR, on the Caucasus, the annual crop of leaves from shrubs growing wild attains about 1000 tons and the first plantation in Crimea have been established in the year 1894 (Sokolov, l.c.).

Besides tannins the second important raw material from *R. coriaria* are the dyes used till this day in the Asiatic part of the range for the dying of materials (carpets). A black dye is supplied by the leaves, a red one by the fruit, a brown one by roots and a yellow one by young shoots. Vavilov and Bukinič (1929) report that leaves of *R. coriaria* are used in this manner in Afghanistan and sold on bazars, and the shrub is planted in the gardens of Herat, Kandahar and Mazar-i-Sharif.

Ripe fruits of *R. coriaria* have also found their way to consumption.

in two forms. Ground to a powder they are added as a spice (similarly as pepper or paprika) to meat and fish dishes. They can also be soaked in water for several hours, and thanks to the tartaric and maleic acids present in the walls a sour fluid is obtained resembling vinegar.

A separate form of *R. coriaria* utilisation is in folk medicine, particularly in Iran and Afghanistan. A brew from the leaves, bark or fruit is used for various illnesses, such as nausea, vomiting, bleeding, diarrhea, ulcers, desintery, is used for washing wounds etc. (Zapryagaeva, 1964).

The range of *R. coriaria* is exceptionally elongated, extending from the Canary Islands, Azores and Madeira (Eriksson et al., 1979) in the west to Tadzhikistan and Afghanistan in the east, that is at least over 80 degrees of longitude. In North Africa *R. coriaria* does not occur, at least in the wild state, and its only stand reported by Quzel and Santa (1963) from the vicinity of Constantine in Algeria is probably not a natural one. It is also not impossible that the shape and extent of the range of *R. coriaria* has been affected by its utilization and cultivation, which could have resulted in the formation of secondary stands.

Almost throughout southern Europe, from Portugal to European Turkey, *R. coriaria* is a fairly common species. It is absent only from some islands in the Mediterranean such as the Balearic Isles, Corse, Sardegna and only one stand is known from Kriti. From the isles of the Aegean it has been reported from Thasos, Samothraki, Lesvos, Samos and Rodhos. On the Balkan peninsula it occurs almost throughout Greece and Albania and also in southern and western Yugoslavia — here only in Dalmatia to the vicinity of Split and in Macedonia as far as Skopje. In Bulgaria *R. coriaria* belongs to rare species and is known only from the valley of river Struma (north to Blagoevgrad), near Goce-Delečev and Momchilgrad in the Rhodope Mts. and in the northeast of the country, where in Dobruja it attains in the north the cape of Kaliakra. Besides it grows on dry mountain slopes of southern Crimea. These latter stands are the most northerly ones in Europe.

In the Asiatic part of its range *R. coriaria* is a common shrub almost throughout Anatolia except for the most dry central regions and the high mountains regions in the east of the country. It is similarly common on the Caucasus, particularly in its western Black Sea part, where as in Crimea it attains Latitude 45°N.

South of Anatolia *R. coriaria* is limited in its range by a narrow Mediterranean belt covering the Lebanon, southwestern Syria, western Jordan and Israel. Extreme southern stands are to be found in the Judean Mts. and in Edom, south of the Dead Sea. Besides *R. coriaria* has been reported also from the Sinai peninsula, however, as can be judged from the information included on the herbarium labels of Ehrenberg (Herb. Kew) and Kaiser (no. 822, Herb. Kew and Nat. Hist. Mus. Wien) we

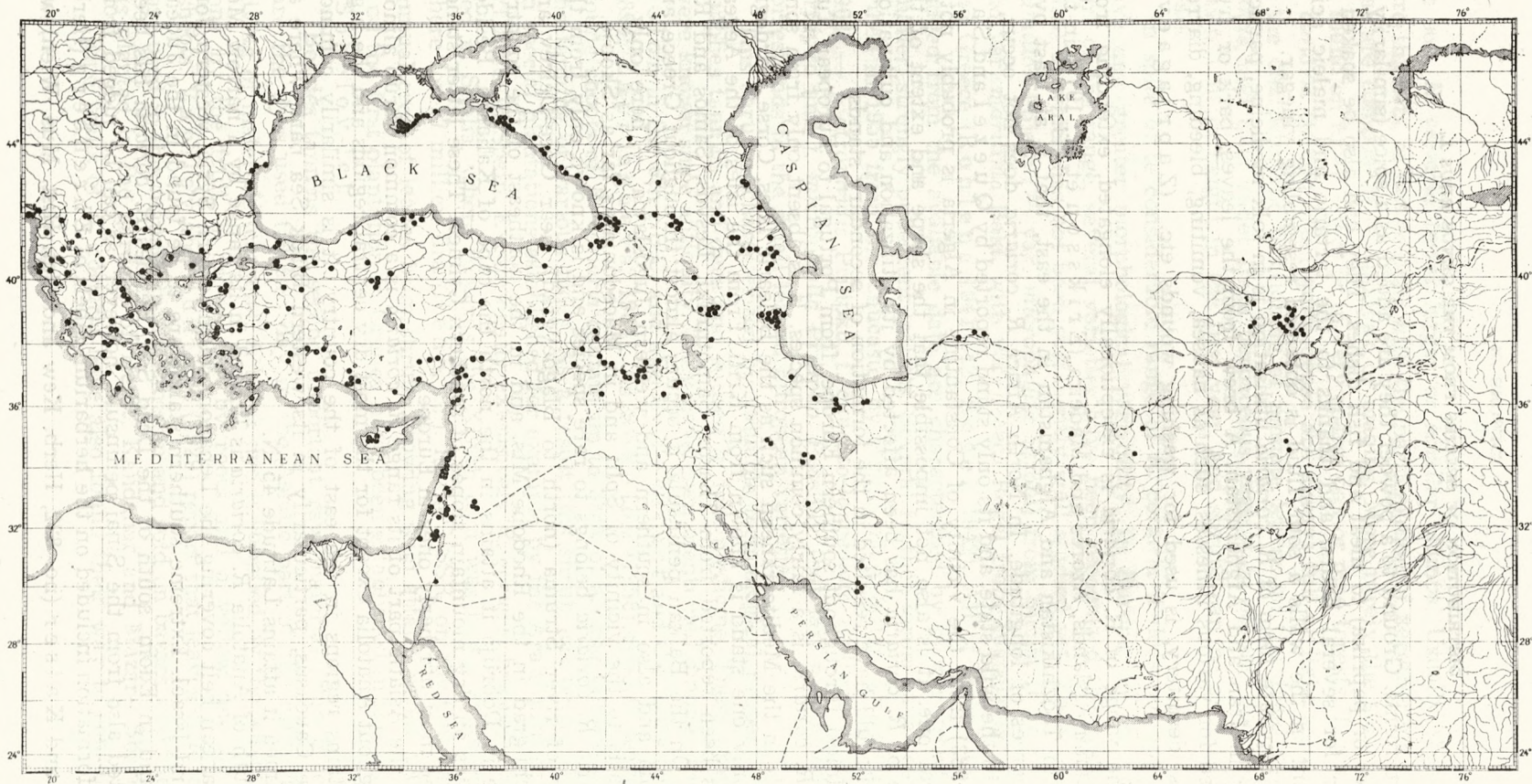


Fig. 1. Eastern part of the range of *Rhus coriaria* L.

are dealing here with shrubs that are under cultivation (see also Täckholm, 1969).

On Cyprus *R. coriaria* grows on rocky slopes of mountains and in vineyards and it is „... locally very common on the Troödos Range”. (Meikle, 1977). In Iraq the range of *R. coriaria* covers only the northeastern part of the country (Kurdistan) and Jabal Sinjar in the west. In southwestern and northern Iran stands of *R. coriaria* are already very scattered and in Afghanistan there are only few of them in the vicinity of Herat and Kabul. It is possible that these are not natural stands.

Beyond southwestern Asia, and distinctly isolated are the stands from the Middle Asiatic republics of the USSR — in Turkmeniya, Uzbekistan and Tadzhikistan. In southern Turkmeniya, near its frontier with Iran, *R. coriaria* grows only in the region of Kara-Kala, in the basin of river Čandyr and in central Kopet-Dag (Linčevskij, Blinovskij, 1950). The second agglomeration of stands is to be found in southern Uzbekistan, where *R. coriaria* grows in the basin of river Tupalanga and Sangardak and in central Tadzhikistan. Here stands are concentrated on the southern slopes of such mountain massifs as Vachsskiy, Karateginskiy and Gissarskiy Khrebet. One of such stands I have seen in 1977 east of Dušanbe, where *R. coriaria* occurs on bare, insolated, rocky slopes together with *Sageretia thea* (Osbeck) M. C. Johnston., *Cerasus verrucosa* (Franch.) Nevski and *Ephedra*. sp.

The vertical distribution of *R. coriaria*, similarly as the horizontal one, is characteristically very extensive. On the Balkan peninsula it grows primarily in the lower elevations, on hills and mountain slopes, usually not higher than 800 - 900 m. The highest stands in Bulgaria are known from an elevation of 1000 m, in Crimea from 1150 m (Wulff, 1953), in Jugoslav Macedonia even from 1200 - 1300 m (Em, 1967) and on Crete from 1450 - 1500 m (Rehinger 14282; Greuter 3715 — in sched.).

In the Asiatic part of its range *R. coriaria* reaches even further up. In Anatolia it has been known from an elevation of 10 m, in the vicinity of Trabzon usually between 600 and 1300 m, and near Artvin it reaches as far up as 2100 m (Tong 476, in sched.). According to Meikle (1977) on Cyprus it grows between 1000 and 1830 m, in Iraq between (500) 700 and 1900 m, in Afghanistan between 1700 and 2000 m and in Iran usually above 1000 m but also as far up as 2300 m (Riazi 5848, in sched.). Similar is the distribution of *R. coriaria* in Uzbekistan and Tadzhikistan, where its stands are distributed between 900 and 1800 m (Zapjagajeva, 1964). In the latter region on thing is noticeable, the isolated stand in the basin of river Zeravshan, located below lake Kuli-Kalon at an elevation of 2600 - 2900 m, is the most elevated stand throughout the range of the species (Zakirov, 1961).

A point map of distribution of the range of *R. coriaria* (Fig. 1) I have

prepared primarily on the basis of herbarium collections (about 300 sheets) from many Herbaria in Europe and Asia (among others: ANK., ATH., E., EGE., G., ISTE., ISTO., JE., KLE., TARI., W., WU.). Besides I have used numerous data from literature, particularly of such authors as: Mitruschi (1955) for Albania, Halácsy (1904) and Rechinger (1943) for Greece, Post and Dinsmore (1932) and Mouterde (1970) for Syria and Lebanon, Wulff (1953) for Crimea, Rechinger (1969) for Iran, Iraq and Afganistan, and Kasapliligil (1956) for Jordan. Very useful were also the local maps of the range of *R. coriaria* on the Caucasus (Grossheim, 1962), in Jugoslav Mecedonia (Em, 1967) and in Tadzhikistan (Zaprjagajeva, 1964; Ovčnikov et al., 1968).

2. *RHUS TRIPARTITA* (UCRIA) GRANDE

SYN.: *R. OXYACANTHOIDES* DUM. — COURS.

In contrast to the previous species this is a small shrub 1 - 2 (3) m tall with thorny branches as opposed to thornless ones and 3-foliolate leaves as opposed to pinnate. It occurs in steppe or desert communities. In the Judean Mts. it is a condominant species in communities of rocky ground (*Lygos raetam-Rhus tripartita*), and in Egypt, on Jebal Elba it enters the association *Acacietum laetae* (Zohary, 1972, 1973). It grows both in the coastal area and enters further inland. Similarly as with *R. coriaria* it is locally used for dyeing and tanning.

A general map of the range of *R. tripartita*, a very approximate one, has been prepared by Davis and Hedge (1971). According to these authors it is composed of two parts clearly isolated from each other, a western and an eastern one. The former covers the Canary Islands, Morocco, Algeria (including Hoggar), Tunisia, Sicilia, Malta and northern Libia, and the latter western Egypt, northeastern Sudan (Nubia), Palestine and Lebanon as well as the shores of the Arabian peninsula. This however is not strictly accurate. It appears that the species does not grow in the Canaries (Eriksson et al., 1979). There are doubts also whether one can speak of a disjunction since Botschantzev (1964) has found *R. tripartita* on the frontier between Egypt and Libia near Es-Sallum and Täckholm (1974) has reported it from the Western Mediterranean coastal region of Egypt. According to that author *R. tripartita* does not occur in northern Egypt on such areas as the Eastern Mediterranean costal region, in the Nile Delta nor in the Isthmic desert. However, it is known from the Sinai peninsula (Täckholm, 1969).

Detailed data on the stands of *R. tripartita* are unfortunately not very numerous. According to Mouterde (1970) this shrub grows in Lebanon, but only in two places, between Beyrouth and Sidon. In Syria it is not known. Information on its stands in Palestine and in Egypt can be found



Fig. 2. Eastern part of the range of *Rhus tripartita* (Ucria) Grande
<http://rcin.org.pl>

among others in Post and Dinsmore (1932), Oppenheimer (1931), Oppenheimer and Evenari (1940), Rechinger (1951), Zohary (1972), Muschler (1912), Blatter (1919, Kasapligil (1956), Nábělek (1923) and Täckholm (1969). According to Zohary (1973) in southwestern Asia *R. tripartita* grows at elevations between 100 and 1400 m.

We have more information from the region of Libia thanks to the publications of Durand and Baratte (1910) and Siddiqi (1978) and the situation is much worse in Saudi Arabia from where Migahid and Hammouda (1974) report in a general way that *R. tripartita* occurs in Hijaz the region on the Red Sea.

On the basis of the above data I have drawn a map of the eastern range of *R. tripartita*, marking with points exact locations of definite stands and with a continuous line the probable limit of the range (Fig. 2).

SUMMARY

On the basis of herbarium materials and literature data the author has prepared maps of the eastern part of the range of two species from the genus *Rhus* L., namely *R. coriaria* L. and *R. tripartita* (Ucria) Grande. The first one is widely distributed from the Canary Islands, Madeira, and the Azores in the west to Afghanistan and Tadzhikistan in the east. In North Africa it does not occur. In Crimea it grows to an elevation of 1150 m, in the Balkans up to 1300 m, on Crete up to 1500 m, on Cyprus up to 1830 m, in Iraq up to 1900 m, in Afghanistan up to 2000 m, in Turkey up to 2100 m and in Iran up to 2300 m. The most elevated stands are to be found in Middle Asia in USSR in the basin of river Zeravshan at 2600 - 2900 m.

The other species, *R. tripartita*, originating from North Africa has its most northerly stands in Lebanon, between Beyrouth and Sidon. In that region it grows also in Israel, Jordan, Egypt, in the western maritime part of Saudi Arabia and in northern Libia, at an elevation of 100 - 1400 m.

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KAZIMIERZ BROWICZ

*Rozmieszczenie gatunków z rodzaju Rhus L. we Wschodnim
 Śródziemnomorzu i w Południowo-Zachodniej Azji*

Streszczenie

We wschodnim Śródziemnomorzu występują 3 gatunki z rodzaju *Rhus* L.: *R. coriaria* L., *R. pentaphylla* (Jacq.) Desf. i *R. tripartita* (Ucria) Grande. O ile pierwszy z nich jest szeroko rozprzestrzeniony, to dwa ostatnie, pochodzące z północnej Afryki, należą na omawianym obszarze do gatunków rzadkich, a nawet bardzo rzadkich. W Europie rosną one tylko na Sycylii. W południowo-zachodniej Azji *R. pentaphylla* znany jest wyłącznie z północno-zachodniego Izraela, natomiast *R. tripartita* posiada tutaj więcej stanowisk.

Oprócz tych trzech gatunków, we wschodnim krańcu południowo-zachodniej Azji, we wschodnim Pakistanie, pojawiają się cztery dalsze gatunki, jak: *R. chinensis* Mill., *R. mysurensis* Heyne ex Wight et Arn., *R. punjabensis* Stewart ex Brandis i *R. succedana* L. Dane o ich stanowiskach są jednak bardzo skąpe. W związku z powyższym autor ograniczył się do omówienia tylko dwóch gatunków: *R. coriaria* i *R. tripartita*.

Zasięg *R. coriaria* rozciąga się co najmniej przez osiemdziesiąt stopni geograficznych, od Wysp Kanaryjskich, Azorów i Madery na zachodzie, po wschodni Afganistan i Tadżykistan na wschodzie; w północnej Afryce krzew ten nie występuje. Zarówno na Bałkanach, jak i w Anatolii oraz na Kaukazie *R. coriaria* jest dosyć pospolity. Dalej w kierunku wschodnim, w Iranie i w Afganistanie jego stanowiska są nieliczne i rozproszone. Najdalej na północ sięga on w ZSRR na Krymie, po około 45° szer. geograf. półn. Najdalej na południu pojawia się w Izraelu oraz w Jordanii, na południe od Morza Martwego. Na Krymie rośnie do 1150 m n.p.m., na półwyspie Bałkańskim do 1300 m, na Krecie do 1500 m, na Cyprze do 1830, w Iraku do 1900 m, w Afganistanie do 2000 m, w Turcji do 2100 m, w Iranie do 2300 m, a w Środkowej Azji w Tadżykistanie nawet do 2600 - 2900 m.

Pomimo rozległego zasięgu *R. coriaria* charakteryzuje się stosunkowo małą zmiennością morfologiczną. Wyodrębniono u niego w Europie i na Kaukazie kilka odmian i form, których wartość systematyczna nie jest jeszcze dobrze poznana. Odznaczają się one drobnymi silnie owłosionymi listkami i słabszym wzrostem.

R. coriaria jest krzewem dorastającym do 2 - 4 m wysokości, jednak niekiedy osiąga większe rozmiary, jak np. w Uzbekistanie, skąd opisano okazy o wysokości 6 - 8 m i średnicy pnia 15 - 20 cm. Jako gatunek helio-, termo- i kserofilny rośnie z reguły na miejscach odsłoniętych i dobrze nasłonecznionych. Dzięki dużej zdolności wydawania odrośli korzeniowych tworzy on większe lub mniejsze zarośla. Odznacza się cennymi właściwościami technicznymi, dostarczając garbników i barwników. Znajduje także zastosowanie w medycynie ludowej oraz stosowany jest jako przyprawa w celach konsumpcyjnych (owoce). Właściwości te były już znane w starożytności.

Drugi gatunek, we wschodnim Śródziemnomorzu, występuje w północnej Libii, w Egipcie, Izraelu, Jordanii oraz Libanie, a ponadto również w północnym Sudanie

(Nubia) oraz w zachodniej, przymorskiej części Arabii Saudyjskiej. W południowo-zachodniej Azji rośnie między 100 - 1400 m n.p.m. i często tworzy zbiorowiska, w których współuczestniczy *Retama retam* (Forssk.) Webb. Najdalej wysunięte na północ stanowiska znajdują się w zachodnim Libanie, między Bejrutem a Sydonem.

Na podstawie materiałów zielnikowych oraz danych z literatury autor opracował mapy wschodniej części zasięgu tych dwóch gatunków.

КАЗИМЕЖ БРОВИЧ

Размещение рода *Rhus* L. в восточном Средиземноморьи и юго-западной Азии

Резюме

В восточном Средиземноморьи встречаются 3 вида с рода *Rhus* L.: *R. coriaria* L., *R. pentaphylla* (Jacq.) Desf. и *R. tripartita* (Ucria) Grande. Если первый из перечисленных широко распространен, то последние два, происходящие с северной Африки, на описываемой территории принадлежат к числу редких или даже очень редких видов. В Европе они растут только на Сицилии. В юго-западной Азии *R. pentaphylla* известен лишь в северо-восточном Израиле, а у *R. tripartita* здесь больше местобитаний.

Кроме этих трех видов, на восточных окраинах юго-западной Азии, в восточном Пакистане, появляются еще четыре вида: *R. chinensis* Mill., *R. mysurensis* Heyne ex Wight et Arn., *R. punjabensis* Stewart ex Brandis и *R. succedana* L. Однако данных о встречаемости этих видов очень мало. В связи с этим автор ограничивается описанием только двух видов: *R. coriaria* и *R. tripartita*.

Ареал *R. coriaria* распространяется по меньшей мере на восемьдесят градусов, от Канарских и Азорских островов и острова Мадера на западе, до восточного Афганистана и Таджикистана на востоке. В северной Африке этот кустарник не встречается. На Балканах, в Анатолии и на Кавказе *R. coriaria* встречается довольно часто. Дальше в восточном направлении, в Иране и Афганистане его местобитания немногочисленные и рассеянные. На севере дальше всего он доходит в СССР в Крыму — до 45° сев. широты. Дальше всего на юге появляется в Израиле и Иордании, к югу от Мертвого моря. В Крыму он растет до 1150 м над ур. м., на Балканском полуострове до 1300 м над ур. м., на острове Крит до 1500 м, на Кипре до 1830 м, в Ираке до 1900 м, в Афганистане до 2000 м, в Турции до 2100 м, в Иране до 2300 м, а в Средней Азии и Таджикистане даже до 2600 - 2900 м.

Несмотря на обширный ареал *R. coriaria* отличается сравнительно небольшой морфологической изменчивостью. У описываемого кустарника было выделено в Европе и на Кавказе несколько разновидностей и форм. Однако их систематическая ценность изучена еще не слишком хорошо. Они характеризуются мелкими, сильно опушенными листьями и более медленным ростом.

R. coriaria является кустарником достигающим 2-4 м высоты, однако иногда он превышает указанные размеры, например в Узбекистане, где были описаны экземпляры высотой в 6-8 м с диаметром ствола 15-20 см. Будучи видом гелио-, термо- и ксероморфным он растет как правило на открытых, хорошо освещенных местах. Благодаря хорошо развитой способности образования корневых отпрысков, он образует большей или меньшей величины заросли. Он характеризуется ценными техническими свойствами и употребляется для получения дубильных веществ и красителей. *R. coriaria* находит также применение в народной медицине, а его плоды применяются в качестве приправы в пищу. Эти свойства были уже известны в древности.

Второй вид, в восточном Средиземномории, встречается в Ливии, Египте, Израиле, Иордании и Ливане, а кроме того в северном Судане (Нубия) и западной, приморской части Саудовской Аравии. В юго-западной Азии встречается от 100 до 1400 м над ур. моря, часто образуя сообщества, в которых принимает участие *Retama retam* (Forssk) Webb. Самое северное местообитание находится в западном Ливане, между Бейрутом и Сидоном.

На основании гербарных коллекций и литературных источников автором разработаны карты восточной части ареала этих двух видов.