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CITRUS FRUITS
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CITRUS FRUITS (Pers. *morakkabāt*). As far as Persia is concerned, only the citrus trees and fruits of the genus *Citrus* L. (family Rutaceae, subfamily Aurantioideae) need be considered. Only the following three species and one hybrid of citrus fruits are mentioned in classical sources: *Citrus medica* L., *Citrus aurantium* L., and *Citrus limon* (L.) Burn. f. (and/or *C. aurantifolia* Swing., etc; for the indeterminate nature of the latter species, see below).

History. 1. *Citrus medica* (lit. "Median citrus") L., the citron (see also bālang). Despite its scientific designation, which is an adaptation of the old name in classical Greek sources, namely *medikon mēlon* (lit. "Median apple/pome"), this fruit was not indigenous to ancient Media and Persia, though it was there that the citron became known to the Greek botanists accompanying Alexander during his campaigns in Persia. Its westward spread to the eastern Mediterranean region was owing to the Greeks and, most likely, the Jews, who had probably become acquainted with it during their exile in Mesopotamia in the 6th century b.c.e. (see Reuther et al., pp. 2-3). According to the Greek botanist Theophrastus (ca. 310 b.c.e.; I, pp. 310-13), *medikon mēlon* was a thorny tree with fragrant leaves and fruits that grew in Media and Persia. The fruits, though not edible, were taken with wine as an emetic in case of poisoning and were placed among clothes to repel moths; the decoction or the juice of its "inner part" (pulp?) was used in mouthwash to sweeten the breath. Theophrastus' description was more or less repeated by Pliny the Elder (23-79 c.e.) and by Dioscorides (fl. 41-68 c.e.). The latter's report (bk. 1, no. 166, pp. 84--85, s.v. *medika*) indicates that the citron tree was already well known in

Europe in the 1st century c.e., especially as an ornamental tree. According to him, it bore fruit throughout the year, and this fruit was eaten especially by women (cf. Ebn al-Bayṭār, I, pt. 1, p. 11). According to Pliny, Parthian notables used its seeds as a condiment in food in order to sweeten bad breath. He added that some peoples tried to grow it for its medicinal virtues but that the tree refused to grow anywhere but in the land of Media and Persia (cited in Pūr-e Dāwūd, pp. 76-77).

The citron is the only citrus fruit mentioned in Middle Persian sources. According to the *Bundahišn* (see Asmussen, pp. 15-17), it is one of the ten kinds of fruit that "are edible inside and outside." In the later version of this tradition (Ṭabarī, I, p. 127; Baḷʿamī, ed. Bahār, p. 92), it is one of the ten fruits without either peel or seeds that God sent to Adam from paradise. In the Pahlavi story *Xusraw ī Kawādān ud rēdag-ē* (par. 45, p. 24), *wātrang* (incorrectly rendered by J. M. Unvala as "lemon") is mentioned (along with *xār-wātrang*, quince, almond kernels, myrobalans, etc.) among the best fruits for candying (cf. the Arabic version of this story in Ṯaʿālebī, *Ḡorar*, pp. 705-11).

In classical Persian literature the citron is mentioned variously as *bādrang* (variants *bāḏ/trang*, *bād/ḏarang*), *tora/onj*, and, later, *bālang*. Various popular etymologies have been suggested for these names (e.g., Bīrūnī, p. 21; Kāšānī, I, p. 39; ʿAbd-al-Rašīd, I, pp. 194, 424-25). The derivation suggested by Wilhelm Eilers (see bālang) does not seem convincing. *Otroj(j)* is the arabicized form of *otro/anj*, itself a variant of *toro/anj* (earlier *toro/ang*). *Torang/j* is a doublet (or maybe originally a dialectal variant) of *w/bātrang/bālang* (cf. *vārang* in Kāšānī, I, p. 39; cf. also Māzandarānī *vāreng*). As Berthold Laufer pointed out (p. 301 n. 581), Persian *tora/ong/j* is ultimately derived from Sanskrit *mātula/ā/i/unga* "citron (tree)" (see also Monier-Williams, p. 807; Turner, p. 575 no. 10013). Another obsolete designation for the citron in some classical sources in Arabic (e.g., Ebn Maymūn, Ar. text, no. 1, p. 4), namely *toffāḥ māʾī* (lit. "aquatic apple"), is an inaccurate spelling or reading of *toffāḥ māyī* (= *māhī*, *mādī*) "Median apple"—an early Arabic calque of the above-mentioned Greek expression found, with consequent misinterpretation, in a number of sources (e.g., Bīrūnī, p. 22; Kāšānī, I, p. 39). Ebn al-Bayṭār (d. 648/1248) is the first to have pointed out (I, bk. 1, p. 139, s.v. *toffāḥ māʾī*) that this appellation refers to the country of Māh, that is, Media, and not to *māʾ* (water).

In Arabic and Persian sources many places in Persia where citrus fruits were grown are mentioned. Citrons were reported from Arrajān, Bīšāpūr, Fasā, Ḵabr/Ḵafr (*toranj-e sammāma* "fragrant citron"), Kāzerūn, Sīmakān (Ṣemkān),

Šūš (*toranj-e dastanbūy* “fragrant citron”), Jīroft, Balḵ, Gorgān, Astarābād, and Āmol in Māzandarān (Eṣṭaḵrī, p. 127; Ebn Ḥawqal, pp. 182, 311, 382; Moqaddasī, pp. 421, 424, 357; *Ḥodūd al-ʿālam*, ed. Sotūda, pp. 137, 139, 145; tr. Minorsky, pp. 130, 131, 135; Ebn al-Balḵī, pp. 130, 134, 139, 142; Nāṣer-e Ḵosrow, p. 164; *Nozhat al-qolūb*, ed. Le Strange, pp. 117, 126, 160).

There are indications that the above-mentioned etymologically synonymous names for the citron were later somehow differentiated in order to designate some varieties of citron. For instance, ʿAlī b. Sahl Ṭabarī (3rd/9th century) seems to have made a distinction between the *otroj* (pp. 382, 393, 397) and the *toranj* (if the reading in the faulty published text, pp. 402-03, is correct), mentioning different medicinal properties of each; about the latter he says only that “it is hot and dry, burns the phlegm, and kills [intestinal] worms.” Baḷʿamī (ed. Bahār, p. 91) mentioned the *toranj* and the *bādrang* as two distinct fruits sent down from paradise to Adam on earth. According to the *Nowrūz-nāma* (Ḵayyām [?], p. 314), it was the Kayanid Fērēdun who first introduced the seeds and seedlings of such fruit trees as the *toranj*, *nāranj* (sour orange), *bādrang*, and *līmū* (lemon). There are many references to the *toranj* in Persian literature and folklore, sometimes as a fine, fragrant fruit held in the hand and smelled (cf. the *toranj-e dastanbūy*). According to Moḥammad-Moʾmen Ḥosaynī Tonokābonī (p. 43), smelling the *toranj* is exhilarating and strengthens the heart. Manūčehrī (p. 163) mentioned the *toranj*, quince, *noql*, and kabob as choice foods for an intimate gathering. The *toranj* is also the citron used in a nuptial custom, now largely given up, in which the groom throws such a fruit to the bride upon her arrival at his house and she reciprocates (Moḥammad-Pādšāh, II, p. 1083; cf. the custom still current in the villages around Nīšābūr; Šakūrzāda, p. 201; see also Massé, *Croyances*, pp. 75, 80, 86; tr., pp. 57, 63, 69; for a similar custom in Afghanistan, see Hackin and Kohzad, p. 190).

Several varieties of citron are described more factually in some sources. Bīrūnī (p. 22), discounting a statement by the Arab poet Abu’l-Ḥasan ʿĀmerī (d. ca. 13/634) that both the pocked (*mojaddar*) and corrugated (*molazzaz*) varieties of citron (having acid and sweet pulp respectively) occur on the same tree, declared that his own experience did not confirm it, adding, “All the *otrojje*s brought from Ṭabarestān are pocked, those in Jorjān are smooth[-skinned], and acidity is common to the pulps of both.” The vizier Rašīd-al-Dīn Fażl-Allāh (d. 718/1318), who was also interested in horticulture, mentioned four varieties of *toranj*. The best variety, called *sabūʾī*, is large and oblong with superior taste, smell, and [medicinal] virtues; its tart pulp yields the best

ḥommāż (citron pulp) wine, but the shrub, the most delicate of all citron trees, cannot withstand the slightest cold. A second variety, which grows very big fruit, is abundant in Āmol, Rostamdār, Šabānkāra, and Baghdad. The third kind, which is oblong and of medium size, is found in most places. Finally, there is a variety that has a sweet pulp, with subvarieties depending on climate and soil.

Rašīd-al-Dīn (pp. 51-53) referred to the possibility of successfully grafting the *nāranj* scion not only onto different species of citrus but also onto apple, azarole, pear, and quince trees and onto pomegranate rootstock; he added that "a different *ḵāṣṣīya*" (peculiarity) will result in each case (cf. Ebn al-ʿAwwām, quoted in Leclerc, II, p. 112). He reported that, after taking special precautions, he had succeeded in growing *nāranj* trees in as cold a region as Tabrīz.

3. *Citrus limon* (L.) Burm. f., the lemon (*C. aurantifolia* Swing.), the lime, and so on (Pers. *līmū* < Skt. *nimbū*; see Mayrhofer, *Dictionary* II, p. 166; cf. Gīlakī *līmbū* [Pāyanda, p. 727] and *lembū* and *lemā* in Baluchestan [Pārsā, I, p. 1526]). No mention of this fruit is found in the early Persian and Arabic sources. According to a marginal note found in one of the manuscripts of Bīrūnī (printed text, p. 334; no counterpart in Kāšānī's Persian adaptation), the *līmū* was exported from Qoṣdār (Ḵozdār, now in West Pakistan). The fruit is described as being like the *nāranj* in its pulp and appearance but with a sturdy, smooth peel and some bitterness in taste, which stimulates the stomach and is good for the heart. Early geographers made no mention of the *līmū*. The earliest mention of the fruit in Persian seems to have been by the poet Nāṣer-e Ḵosrow (d. 481/1088; quoted in Dehḵodā, s.v.). Ebn al-Balḵī (fl. early 6th/12th century; pp. 134, 142) and Mostawfī (*Nozhat al-qolūb*, ed. Le Strange, pp. 126, 160) reported it as a local product from Ḵabr, Sīmakān, Bīšāpūr, Kāzerūn, and Āmol. Bosḥāq-e Aṭʿema mentioned the sour lemon and lemon pastille (pp. 83, 122). The most detailed botanico-agricultural discussion of the *līmū* is in the work of Rašīd-al-Dīn (pp. 53-54). He mentioned a variety, called *yaʿqūbī* in Baghdad, which was abundant in Egypt but scarce in other countries. It had a very thin peel but was the most fragrant and the best variety for juice. He also referred to other larger but inferior varieties, one of which, though large, was not too sour; it grew in Āmol.

The earliest therapeutic account of the *līmū* in the sources is from Ebn Jazla (quoted by Ḥājj Zayn, pp. 451-52), according to whom the peel of the *līmū* and the leaves of its tree are hot and dry in the first degree; the action of its aroma on the brain is like that of the citron; and its pulp is more beneficial and rather

stronger than that of the citron. The first elaborate description in Persian of the medicinal properties of the lima is that by Tonokābonī (pp. 777-78), who claimed that the *līmū* is like the *toranj* in all its properties. He also mentioned the "lemon pickled in salt water," which fortifies the stomach and sweetens the eructation, and the *līmū-ye šīrīn* (sweet lemon), which is "much inferior [to the acid lemon] in beneficial virtues, but is not harmful to the nervous system."

In comparison with *āb-e nāranj*, there are many uses for *āb-e līmū* (lemon/lime juice) in the Safavid cookbooks. As an acid condiment, usually sweetened with sugar and sometimes used interchangeably with it, it was also employed in a wide variety of dishes (Bāvaṛčī, pp. 43, 52, 54, 87, 134, 147, 178, 179; Nūr-Allāh, pp. 231, 245, 249). Nūr-Allāh (p. 221) also mentioned a certain variety called white *līmū* from Dārābjerd in Fārs, which was sliced and used in a kind of rice dish (*līmū palāv*).

4. The *morakkab* (lit. "composed, combined"). This term was applied to the fruit(s) presumably resulting from the grafting (*peyvand*) of the above-mentioned citrus trees onto one another. In Persian sources this term was already used by Nāṣer-e Ḵosrow (p. 63), who, in 416/1038, mentioned it as a fruit grown in Egypt. Ḥamd-Allāh Mostawfī (*Nozhat al-qolūb*, ed. Le Strange, p. 160) reported it as one of the natural products of Āmol. Rašīd-al-Dīn's remark (p. 50) that many varieties of *morakkab* citron were obtained through the *peyvand* of a *toranj* scion onto another *toranj* rootstock or onto the *nāranj* and *līmū* trees may have referred to chance cross-pollination between the blossoms of the scion and of the rootstock. The same explanation may be applicable to *astanbūb*, which, according to Tonokābonī (p. 78), was the name of a fruit resulting from the combination of the *nāranj*, *toranj*, and *līmū*, which is weaker than the *toranj* in its medical actions but stronger than the *līmū*. The word *astanbūb* (*astīūb*, *astabūn* in Anṭākī, I, pp. 40, 247-48), not found in Persian lexicons, may be a corruption or a variant of *dastanbūy*, mentioned as a variety of *toranj* in *Ḥodūd al-ʿālam* (ed. Sotūda, p. 139; tr. Minorsky, p. 131). Ebn Loyūn (d. 750/ 1349) mentioned a citrus fruit called *estonbūtī*, which, according to him, had two varieties: one larger than the lemon and the other round like a melon (cited by Dozy, I, p. 21 s.v.). Anṭākī seems to have been referring to the same fruit when he defined *astabūn* (I, p. 40) as the Persian name of a fruit called *zonbūʿ* in Arabic, of which he identified two varieties. One variety (called *kobbād*) was obtained by grafting *otroj* scions onto the *nāranj* tree, and the other (called *ḥommāż šaʿīrī* in Egypt), which was the size

of the lemon but elongated (*mostaṭīl*) in shape like the *otroj*, resulted from the grafting of the same onto the lemon tree. Another product of such grafting was *astīūb*, resulting from implanting a scion of the genuine small globular, yellow, and thin-skinned lemon tree onto the *otroj* tree (I, pp. 247-48).

The early authors did not mention any use other than medicinal for the *morrakab*; only Bosḥāq-e Aṭʿema (p. 40) referred to the *morakkab* pickled in vinegar. The term *morakkab* is no longer used in this sense in Persian.

Citrus fruits in contemporary Persia. Two principal citrus-growing zones can be readily distinguished on the basis of their general climatic and ecological characteristics: the Caspian and the southern zones.

The Caspian littoral is characterized on the whole by very cloudy, humid weather (with about 800 mm of average annual rainfall at Šāhī in eastern Māzandarān and more than 1,200 mm at Rāmsar in western Māzandarān); summers are hazy and mild to hot, whereas autumns and winters are very cloudy and cool to cold. Sometimes unpredictable cold fronts from Siberia occasion heavy snowfalls and freezing weather, which cause severe damage to citrus plantings. For instance, disastrous cold weather and frost in 1342 Š./1963-64 ruined citriculture not only on the Caspian littoral but also as far south as Kermān, Fārs, and Ḵūzestān. Consequently the government imported from California 700,000 seedlings of twenty-one supposedly more cold-resistant varieties of citrus (sweet oranges, mandarins, lemons, and grapefruits), which were distributed to citrus growers in all the affected areas. Except, however, for satsumas, Clementine mandarins, and Thompson navel oranges, the imported varieties cultivated in the Caspian zone perished during another severe frost of 1347 Š./1968-69, which destroyed at least 40 percent of all citrus seedlings and 25 percent of full-grown citrus trees in this zone (Ebrāhīmī, 1359 Š./1980, pp. 43-44; Ketābī, p. 26). Walter Reuther, summarizing his observations on the climate of the Caspian zone, concluded (pp. 17, 18) that it “is not ideal for citrus culture in two important aspects: 1. high frost hazard, and 2. a deficiency of sunshine and heat in the September-December period,” which is “critical for the development of early maturity and high quality citrus fruits.” Consequently, commercial growers harvest most citrus produced (especially sweet oranges) before the winter solstice, that is, before mandarins and sweet oranges are mature and sweet enough to satisfy consumers (Reuther, pp. 17, 18).

On the other hand, too much air and soil moisture in the Caspian zone greatly

favors the growth and spread of citrus pests and diseases, all the more so because overall chemical controls are neglected or inadequate. In Māzandarān in 1353 Š./1975 Reuther (pp. 18-19) briefly observed in citrus plantings the fungus disease called gummosis (or footrot); such viral diseases as psorosis, impietratura and "ring pattern"; insect pests and arachnids (notably, the "red spider"); and various scales, all of which cause considerable damage to citrus trees and fruits in the Caspian zone (for a detailed report see, Mojtahedī, pp. 86-138).

As for soil texture and chemical composition in the Caspian zone, according to Reuther, "the majority of the soils are deep, well-drained, fertile, and moisture-retentive well adapted to citrus culture." Furthermore, unlike most soils in the southern citrus-growing zone of Persia, they are low in free carbonates and devoid of the salinity so harmful to citrus rootstocks and fruit quality (p. 16).

The major citrus-growing districts in the Caspian zone are Behšahr, Sārī, Āmol, Šahsavār, Čālūs, and Rāmsar in Māzandarān and Čāboksar, Lāhījān, Langarūd, and Anzalī in Gīlān. In Gīlān, however, because of higher annual rainfall and because this province is exposed more directly and more often to cold northeasterly winds blowing over the Caspian in winter, the principal citrus crop is the *nāranj*, the tree of which is the most cold-resistant citrus tree in Persia (Komīsīūn-e mellī, II, p. 1657; for detailed climatic and ecological data about citrus growing on the Caspian littoral, see Reuther, pp. 16-20 and annex tables; further valuable information, mostly of a practical horticultural character, is to be found in Ebrāhīmī, 1364 Š./1985). Gorgān, mentioned as a citrus region in some sources (e.g., Bahrāmī, I, p. 414; Komīsīūn-e mellī, p. 1658) is not commercially important in this regard, though *nāranj* trees abound in dooryards and in the suburban orchards of the city of Gorgān.

The southern citrus-growing zone can be divided into two ecologically distinct subzones: the region lying between 28° and 32° N, including the citrus districts of Ḵūzestān, Fārs, and Kermān, and the region below 28° N along the Sea of Oman and the Persian Gulf. Climatic and ecological diversity is great among the citrus-growing areas in the three provinces of the first subzone (in contrast to the comparatively small diversity in the Caspian zone; Reuther, p. 47), but, generally speaking, this subzone is characterized by the high frequency of severe frost, excessive summer heat, and drought, which damage citrus foliage and fruits and "reduce fruit set" (Reuther, p. i). This subzone is generally arid or semiarid, with highly calcareous but well-drained soils; like date-palm and other plantations citrus plantings are centered in districts resembling oases or

inland valley floors. Except in Ḵūzestān, where plenty of water suitable for citriculture is now available from two large dams for large-scale irrigation, water for citrus growing is obtained from *qanāt*s, deep wells, springs, or small streams diverted from rivers. In Ḵūzestān and Fārs, because of appreciable winter rainfall, the lands under citriculture are generally free of the noxious soil salinity found to varying degrees in some other southern areas. The principal citrus pest is the "red spider" (Reuther, p. 24, has reported severe damage caused by this arachnid in many parts of Ḵūzestān); sporadic cases of the viral "stubborn disease" have also been observed by Reuther (e.g., in Kāzerūn and Jīroft, pp. 30, 43). Citrus trees are interplanted in some districts (e.g., Jahrom) with date palms, which supposedly protect them from excessive sunshine or frost. This measure seems, however, to be counterproductive, because "local agricultural officials estimate that citrus trees grown under the shade of date palms produce only about one third of the yield of trees grown in full sun" (Reuther, p. 35). Citrus plantations are not usually enclosed, but some private commercial citrus orchards are surrounded by solid mud walls about 3 m high as a special measure against dust storms (e.g., in the Bam-Nammāšīr area of Kermān), as windbreaks (e.g., in Dārāb and in some orchards in Ḵūzestān), and to create less harsh microclimates within the enclosures.

The principal citrus-growing districts are Dezfūl and Ahvāz in Ḵūzestān; Shiraz, Ḵafr, Dārāb, Jahrom, and Kāzerūn in Fārs; and Bam-Narmāšīr, Jīroft, and Šahdād in Kermān. Among them Kāzerūn, with an average winter rainfall of 398 mm, seems to have the best climate for citrus growing, "balancing both frost hazard and high temperature injury factors" (Reuther, pp. 27, 29). Incidentally, in the western province of Kermānšāhān foreign varieties of sweet oranges, like the shamouti and the Washington navel, were imported before World War II and grown in the warmer districts of Qaṣr-e Šīrīn, Gīlān-e Ḡarb, and other areas, whence scions or budwoods of those varieties were later taken to Ḵūzestān and Māzandarān for experimental cultivation (Komīsīūn-e mellī, II, p. 1658; for *morakkabāt* in Qaṣr-e Šīrīn, see Bahrāmī, I, p. 415).

The citrus-growing subzone below 28° N is essentially a tropical region, including littoral plains of the three *ostān*s of Sīstān-Baluchestan, Hormozgān, and Būšehr. The major citrus-growing area is centered in the districts of Bandar-e ʿAbbās(ī) and Mīnāb in Hormozgān. There is no frost hazard in this region, but large-scale economic citriculture is severely constrained by an

excessively hot and mostly very humid climate, excessive salinity of the soils and of the irrigation water available from wells, and insignificant rainfall, which occurs mostly in the period November to February (Reuther, pp. 3, 45). Only some varieties of lemons and limes are reported to show the comparatively high ecological adaptability and hardy growth, despite considerable salt and heat injuries to their foliage and fruits (Reuther, p. 45).

The Ministry of agriculture has several citrus experimental stations and nurseries, at Rāmsar, Kotrā, and Ḵorramābād in Māzandarān; Ṣafīābād (near Dezfūl), Kāzerūn, Dārāb (near Bam), and Mīnāb. Sāzmān-e ʿomrān-e Jīroft (Jīroft development organization) and Mojtamaʿ-e kešt o ṣaṇʿat-e Jīroft (Jīroft agro-industrial complex) in Kermān also carry out experiments and research on citrus growing. The largest and best-managed station seems to be the one at Ṣafīābād. The Mīnāb experimental station, established by the famous French citrus specialist Henri Chapot, has the largest collection of citrus varieties. Sazmān operates the largest and best-managed nursery of high-quality seedlings and rootstocks in the southern zone; it also runs a citrus demonstration farm north of Mīnāb (Reuther, pp. 41, 44, 45). In 1355 Š./1976 Reuther (p. 47) remarked: “[T]oo many important, real problems facing citrus growers are ignored altogether by experiment station personnel because of lack of adequate resources, of appropriate training, and of motivation.” The situation does not seem to have improved since.

1. *Citrus medica* L. The earliest explicit varietal distinction of *Citrus medica* in Persian sources is by ʿAqīlī Ḵorāsānī (p. 100), who distinguished a small (*toranj*) and a large variety (*bālang*). This distinction, however, may have been adapted from Sorūrī Kāšānī (I, p. 164; cf. *Borhān-e qāṭeʿ*, ed. Moʿīn, I, p. 226; see also Dāʿī-al-Eslām, II, p. 244; Sāyabānī, p. 843).

In the last century G. V. Mel’unof (tr. Golzārī, pp. 146-47), listing the plants of Māzandarān, noted that *bādrang/vāreng*, known for its size and fragrance, was often used to decorate rooms. He also mentioned the *bālang* as a variety of *bādrang* used for candying and the *dabba* (described and illustrated in Chapot, 1965, pp. 104-05) as a kind of large *bādrang* with a rugose yellow rind. In the 18308 Alexandre Chodźko, mentioning citrus fruits grown in orchards and on the coastal plain in Gīlān (tr., pp. 62-64), briefly described four varieties of citron there. The first was the *bādrang*, with two subvarieties, acid and sweet, both used for candying; it grew as large as melons in Europe. Early in the spring crystal carafes were placed on some small fruits with their stalks and left hanging from the tree until they grew as big as the volume of the carafes

would allow; then they were severed from the stalk and offered to esteemed friends. (Such carafes are usually used as decanters for serving vodka.) The second variety, the *bālang*, was yellow and ovoid and larger than the *bādrang*; the pulp was eaten and the fragrant rind candied. The third variety, the *toranj*, was a kind of sweet orange with a glandular excrescence on the top; it was not much esteemed in Gīlān. Finally, the *pahn-pahnā* was a kind of *toranj* with the size and form of Madeira Island onions (see also Rabino di Borgomale, p. 52; tr., pp. 47-48).

Chapot, after studying the citrus fruits from different parts of Persia in 1337 Š./1958, concluded that the *bādrang*, *toranj*, and *dabba* are genuine citrons (pp. 102-05, with illustrations) but that the *otroj* and *bālang* are "probably hybrids of the shaddock and the lemon" (pp. 96-97; see also Faḵrāʾī, pp. 155-59; Chapot's assertion may have resulted from regional disparities in the identification of the same fruit),

According to Z. Ḵāvar (p. 235), *bādrang*, a citrus fruit more elongated and fragrant than *bālang*, is the variety most used for candying (for separate recipes for the preserves of both, see pp. 235-36 and 217-18 respectively). In fact, at least from the time of Bosḥāq-e Aṭʿema (p. 59), the dainty citron preserve (*morabbā*) has been the main use for this species (for recipes, see Montaẓemī, pp. 473-74). Another contemporary use of the citron is in a distillate (*ʿaraq*) known commercially as *ʿaraq-e otroj*, obtained from the variety of citron known by that name in Fārs and advertised as astringent, antidiarrhetic, antiflatulent, cardiac, tonic, and so on.

2. The sour orange (*nāranj*). As in the past, in areas with a suitable climate *nāranj* trees are favorite evergreens, with fragrant blossoms (*bahār-e nāranj*) and showy, long-lasting fruits. Among the well-known tourist attractions in Shiraz, especially during the period of blossoming in the spring, are two 13th/19th-century orangeries (*nārenjestān*), Bāḡ-e Delgošā and Nāranjestān-e Qawām (see Fasāʾī, II, pp. 165-66; Forṣat-al-Dawla, p. 508; Āryānpūr, pp. 239-59, 268-81). Nāṣer-al-Dīn Shah Qājār had two indoor *nāranjestān*s established within the royal court premises in the unfavorable climate of Tehran. The larger one, adjoining the Golestān Palace, was 70 cubits (*ḏaṛʿ*) long and 8 cubits high and was roofed over with curtains during the cold season. Forty citrus trees, including sour and sweet oranges, mandarin, lemon, *tū-sorḵ*, *dārābī*, and *patābī* (see below), were planted and thriving there along the two sides of a wide water channel covered with blue-glazed tiles (for a full description, see Moʿayyer-al-Mamālek, pp. 41-42). In many cities in Gorgān, Māzandarān, and

Fārs there is hardly any house that does not have at least one *nāranj* tree. In Māzandarān *nāranj* trees are regularly planted along city streets. The importance of this tree in the Caspian provinces is also indicated by many toponyms, for example, Nārenj-Bāḡ (a city quarter in Nekā), Nārenj-Kūtī, Nārenjak-Ben, Nārenj-Kalā, Nārenj-Kol (see, Mel'unof, tr. Golzārī, index; Rabino di Borgomale, index; Razmārā, *Farhang*, s.vv.). Wild *nāranj* trees have been reported by Pārsā (I, pp. 1526-27) in Baluchestan.

In Persia *nāranj* trees, most of which are grown from their own seeds, constitute the principal rootstock on which are budded the more delicate citrus trees (especially the sweet orange) in most citrus areas of the country (Reuther, pp. 20, 22, 27, 35, 39, 42, 44), because they are most resistant to cold weather, to excessive soil moisture, and to gummosis; furthermore, they withstand human neglect and harsh treatment more successfully than any other kind of citrus tree. After the devastating frosts in the last three decades the new plantings in the Caspian zone were again budded on *nāranj* rootstocks, despite efforts by the government nurseries to offer also sweet orange trees budded on *Poncirus trifoliata* L. raf. (a species of a genus allied to *Citrus* L., imported and propagated only for this purpose in the Caspian zone) and on Cleopatra mandarin stocks (Reuther, p. 20; Ebrāhīmī, 1364 Š./1985, p. 11), which are highly recommended as substitutes for *nāranj* stock in the Caspian zone (Reuther, p. 39). In Shiraz the hard, light-colored *nāranj* wood is used for inlaid woodwork (*ḵātam-sāzī*; Wulff, *Crafts*, pp. 76, 93).

Various preserves are made with the petals of the blossoms, the rinds (*ḵelāl*), or the whole fruit with seeds removed. The blossoms also yield a much-esteemed distillate (*ʿaraq*), from which a refreshing sherbet, particularly popular in Shiraz, is made. Mixing tea leaves with a small amount of the dried petals gives the brewed beverage a very pleasant aroma. The rinds are also used in rice dishes (*šīrīn polow* and *moraṣṣaʿ polow*) and as the distinctive ingredient of a special *ḵᵛoreš* in Shiraz; they may be pickled as well. The thickened juice (*robb*) is widely used as a sour condiment and is believed to have some dietetic or medicinal virtues (ʿAlī-Akbar, pp. 25-28, 58, 60-61, 64-65; Ḥekmat, pp. 103, 161-62, 173; Montaẓemī, pp. 469, 472, 557-58, 563, 653-54; Ḵāvar, pp. 138, 150, 225-26, 215-16, 229-30, 266).

3. The *līmū*. In contemporary Persia *līmū* is a common name for all species and varieties of limes, lemons, limettas, and the like. *Līmū*s are popularly divided into *šīrīn* (sweet) and *torš* (sour).

The Persian *līmū-šīrīn*, with its comparatively few and minor varieties (mostly rather recent imports; see Ebrāhīmī, 1359 Š./1980, pp. 47-48), is probably the *Citrus limetta* Risso (= *C. lumia* Risso and Poit., *C. limonum* Risso var. *dulcis* Moris, *C. medica* L. var. *limetta* Hook., etc.), the limetta or sweet lemon—a medium-sized globose species with a thin, pale-yellow rind and a very juicy pulp (sweetish or insipid). In the group "limettes" Chapot (p. 98) reports that "under very diverse names, such as *Limou Chiri* [*šīrīn*?], *Benshar* [Behšahr?] lime, Māzandarān sweet lime, and Dezfūl sweet lime, one finds what seems to be a unique variety" and that "further, it is impossible to make a difference between this variety and the sweet lime of Palestine or *Lemoun Helou* [sic]." Valued and consumed mostly for its medicinal properties, the *līmū-šīrīn* is grown only on a small scale both in the Caspian and in the southern citrus-growing zones (Reuther, pp. 27, 41-42; Chodźko, tr., p. 63; Faḵrāʾī, p. 157). Its juice is prescribed in traditional medicine as a potent *ḵonakī* (coolant), especially in infectious fevers (e.g., typhoid and diphtheria). Recipes for a *morabbā* and a *toršī* of *līmū-ye šīrīn* are provided by ʿAlī-Akbar (pp. 60, 65). The sour group comprises all the species and varieties of both native and imported acid limes and lemons, which may be tentatively identified or presented as follows:

a. *Citrus aurantifolia* Swing. (= *C. lima* Lun., *C. acida* Roxb., *C. medica* L. var. *acida* Hook. f.), which has comparatively small, globose or subglobose, thin-skinned fruits, with yellow or greenish-yellow rind (when ripe) and a greenish pulp, probably includes the limes called *līmū(-ye) āb(ī)* (juice lime). This fruit is probably the one to which Reuther invariably refers as "Mexican lime," which, according to him (pp. 12, 27, 32, 35, 42, 44), is cultivated in Ḵūzestān, Fārs, Kermān, and Bandar-e ʿAbbās(ī) province. Chapot (pp. 91, 108) remarks that among the specimens of citrus fruit sent to him from Persia none could be identified with the fruit known in the United States as "Persian lime." Anyway, the lime (*līmū(-ye) ābī*, *līmū šīrāzī*, *līmū torš*, also called *līmū(-ye) šīšaʾī* in certain places in the south [Ebrāhīmī, n.d., p. 1]), being very sensitive to cold, can be grown only in the southern zone in Persia. Owing to increasing demand, cultivation of limes has greatly expanded in recent decades (see, e.g., Ebrāhīmī, n.d., p. 1). They are the principal source of the commercially bottled *āb(-e) līmū*, which is widely appreciated all over the country.

The *līmū(-ye) ʿammānī* (*ʿomānī*/*ʿommānī*, lit. "lime of Oman," probably because it used to be imported from there) is probably another variety of *līmū-torš*. Pārsā (I, p. 1526) and, following him, Aḥmad Qahramān (no. 1168) have

equated it with *Citrus aurantifolia*. It is not used for juice but is found on the market in dried form as a seasoning, which is used in a variety of dishes (ʿAlī--Akbar, pp. 23, 25 45, 59-60; Montaẓemī, pp. 495, 560, 590-91, 599).

b. *Citrus limon* (L.) Burm. f. (= *C. limonium* Risso, *C. limonia* Osb., *C. medica* L. var. *acida* Pers., etc.) comprises quite a few varieties of the acid lemon common in Persia, generally called *līmū-torš* (*līmū ḵārgī* in Shiraz) and including both native and imported varieties, as well as probably natural hybrids of the two (for recently introduced foreign varieties, see Ebrāhīmī,1359 Š./1980, pp. 38, 43-44). It used to be grown on a limited scale, but in recent decades, owing to increasing public awareness of its richness in citric acid, minerals, and vitamins (particularly vitamin C), its cultivation in separate orchards has been expanding both in the Caspian zone (where it is usually grafted on *nāranj* rootstock) and in some regions in the south, for example, at Dezfūl and Mīnāb. According to Reuther (pp. 25, 45), at the citrus experiment station near Mīnāb "the lemons, as a group, made the most vigorous growth despite considerable salt toxicity symptoms on their foliage" and despite the tropical climate. Some statistics for the agricultural year 1361--62 Š./1982-83 (Wezārat-e āmūzeš o parvareš, I, p. 699) show that in Ḵūzestān alone there were 150 ha of seedlings and 360 ha of fruiting trees of *līmū-torš*, with an annual yield of 2,150 tons (though it is not specified whether or not this *līmū-torš* included limes as well). A large-fruited variety of *līmū-torš*, called *toḡān* (or *to/aḡan*), with a rough rind that is thicker but more aromatic, grows in eastern Māzandarān and is consumed locally (Ebrāhīmī, 1359 Š./1980, p. 41, seems to consider the *toḡān* a natural hybrid, but, according to Chapot, p. 101, "*taḡan*s appear to be true lemons . . . with a nonremontant tree").

As in the case of limes, lemon juice is the principal product of the acid lemons in Persia; it is commercially available in bottles and usually diluted. Both lime and lemon juices are widely used as acid flavorings in several Persian dishes, in *pālūda*, sometimes in tea (see ʿAlī-Akbar, p. 71), instead of vinegar in some salads, and in similar contexts. A refreshing iced sherbet is often offered to guests in the hot season (Montaẓemī, p. 641; see also the Šīrāzī variant, *afšora-ye līmū*, in Ḥekmat, p. 173). Another refreshing sherbet is made with *beh-līmū* (quince-lime) syrup (also commercially available), a special mixture of quince and lime syrups (ʿAlī-Akbar, p. 4; Montaẓemī, p. 643). Limes are also pickled in vinegar or, preferably, in *āb-līmū* itself (for a Šīrāzī-style *toršī-e līmū*, see Ḥekmat, pp. 167-68). Montaẓemī (p. 654) describes the pickles (in vinegar) made from the peels of already juiced *līmū-torš*. Lime juice is also used as an

ingredient in homemade mango pickles (p. 53) and as the only pickling liquid in date *torši* (Montaẓemī, pp. 652-54).

4. The sweet orange, *Citrus sinensis* Osb. (= *C. aurantium* L. var. *sinensis* L., *C. aurantium* L. var. *dulce* Hayne, etc.), commonly called *porto/aqāl* (in Gīlān, *pərtaḵāl*). Its Persian name (lit. "Portugal," probably standing for *nāranj-e Portoqāl* "Portugal orange") indicates the Portuguese role in introducing it into Persia (cf. Italian *portogalo*, Ar. *bortoqāl/n*, and Turkish *portakal*). The sweet orange is most probably indigenous to northeastern India, southern China, and southeastern Asia. Rašīd-al-Dīn's mention (p. 51) of a kind of sweet orange that grew in abundance in Cathay and China is probably the earliest reference in Persian sources to this fruit. His further remark that it was also found in other places (e.g., Baghdad, Kūfa) may reflect a confusion of the sweet orange with the so-called "bittersweet orange," which is a *nāranj* with less acidity and bitterness (for this variety, see Reuther et al., I, p. 431). Portuguese navigators in the 16th century contributed much to the spread and popularization of the better varieties of the sweet orange in countries along their trade route from China to Portugal, including their trading centers in southern India and the Persian Gulf (Reuther et al., I, pp. 11, 380). Reuther (p. 2) assumed, however, that it was taken from India first to Portugal and later, during the Crusades, in Portuguese trading vessels to Persian Gulf ports or overland across modern Turkey to the Caspian region.

The sweet orange is the principal citrus fruit cultivated and consumed in Persia. Still prevalent in all *portoqāl*-growing areas in Persia are the local varieties (propagated mostly on *nāranj* but also on *bakrāʾī* rootstock), which, for fear of possible frost damage, are usually harvested before they are ripe and sweet enough (Reuther, pp. 3-4, 19, 20-22, 27, 32, 35, 38, 41; for a description of local varieties, see Chodźko, tr., p. 64; Rabino di Borgomale, p. 52; Mel'unov, tr. Golzārī, p. 146; Bahrāmī, I, pp. 417-18; Komīsīūn-e mellī, II, p. 1658).

Foreign, improved varieties of sweet orange, like the Thompson navel, the Washington navel, the Frost navel, and the blood orange (*portoqāl-e ḵūnī/sāngīn*), as well as Jaffa, Shamouti, Valencia, Salustiana, and Hamlin oranges, have been imported (at several stages) and more or less propagated in Persia since 1309 Š./1930-31, especially after the heavy snowfall and severe frost of 1342 Š./1963-64 and later freezes proved too destructive to local varieties (for a complete list of imported citrus varieties, see Ebrāhīmī, 1359 Š./1980, pp. 42, 43-48). Among these varieties of sweet orange the Thompson

navel turned out to be the most resistant to cold and survived best after both the 1342 Š./1963-64 and 1347 Š./1968-69 frosts; it has therefore been selected and propagated as the least vulnerable variety by government citrus nurseries at the Rāmsar and Kotrā experiment stations (Ebrāhīmī, 1359 Š./1980, p. 44).

In Persia oranges are frequently eaten as dessert; the seedy varieties are squeezed for juice, which is a favorite drink. A *portoqāl* sherbet described by Montaẓemī (pp. 643-44) includes both *portoqāl* juice and grated peel (see also a Gīlāni recipe in Ḵāvar, p. 212). She also provides the recipe for a *morabbā* made of whole sweet oranges (pp. 468-69; cf. Ḵāvar, pp. 211-12). Sliced orange peel can be used interchangeably with *nāranj* peel in the *morabbā*s, pilafs, and pickles.

5. The mandarin (orange) or tangerine (*nārangī*), *Citrus reticulata* blanco (= *C. deliciosa* Ten., etc.), was probably introduced into Persia later than the *portoqāl*. The numerous varieties of mandarin probably also originated in northeastern India and in southern China (Reuther et al., I, p. 497; Pūr-e Dāwūd, pp. 87-88). The earliest occurrence of the word *nārangī* in Persian is in *Borhān-e qāṭeʿ* (comp. 1062/1651; ed. Moʿīn, IV, p. 2096). It seems that by the time of Nāṣer-al-Dīn Shah (1264-1313/1848-96), this word already designated in Persia a new citrus species or a variety distinct enough from the *portoqāl* (cf. ʿAlī-Akbar, pp. 5, 75; Moʿayyer-al-Mamālek, pp. 41-42; Rabino di Borgomale, p. 52). The kind of fruit described as *nārangī* by Mel'unof (tr. Golzārī, p. 184) and Chodźko (tr., p. 63) does not correspond to the fruit known today.

The citrus varieties that have been imported from foreign countries since 1309 Š./1930 include about thirty varieties of mandarin and mandarin hybrids (including two varieties of tangelos), which were cultivated both in the Caspian and southern zones: varieties like *unshiu* (or satsuma, considered by some citrus specialists a separate species, i.e., Citrus *unshiu* Marcovitch), Clementine, Dwarf Chinotto, Dancy, Algerian mandarin, Temple, and Cleopatra and such hybrids as Kinnow, Fairchild, and Fortune (for a full list, see Ebrāhīmī, 1359 Š./1980, pp. 43-48). Only the satsuma and Clementine survived the severe frosts of 1342 Š./1963-64 and 1347 Š./1968-69, and consequently they have been recognized and propagated as the most suitable varieties for the Caspian zone. Most of the numerous varieties of mandarin mentioned are known only to citrus specialists in Persia, and, except for the *unshiu* (called *nārangī-e onšū*), none of the foreign varietal designations is used by the general public. Nor have all the imported varieties been equally appreciated or propagated. Reuther reported in 1976 (p. 4) that mandarins

were “mostly unshius (mainly in the Caspian zone), local selections of a seedy midseason type with characteristics intermediate between Ponkan and Dancy” and that “a few Clementines [were also] to be found in the Caspian zone” (for details see pp. 21, 27, 35, 42). The tastiest varieties of mandarin reportedly come from Dezfūl, Ḵafr, Šahdād, Narmāšīr, and Bam (Komīsīūn-e mellī, II, p. 1658; cf. Reuther, p. 38). Probably the oldest native mandarin hybrid in Persia is the *bakrāʾī*, grown mainly in Kermān and Fārs. The earliest mention of this fruit in Persian sources is by Sorūrī Kāšānī (11th/17th century; I, p. 207), who defined it as “a fruit like the *nāranj* and the *līmū*, smaller than the former and larger than the latter.” Jamāl-al-Dīn Enjū (*bakrāhī*, *bakravī*; II, p. 1502) added that it was abundant in the province of Īg and Šabānkāra. ʿAqīlī Ḵorāsānī (p. 914), who identified a large (*bakrāʾī-e Makka* “Mecca *bakrāʾī*,” *līmū šīrīn*) and a small variety, described it as a kind of *līmū* that is sweet but has a slight bitterness. According to the *Dāyerat al-maʿāref-e fārsī* (I, p. 436), it is a hybrid of the mandarin and the *līmū* (*šīrīn*?), not so sweet as the parent *nārangī* but retaining its loose skin. Chapot (pp. 98-100) classified it with another fruit called *līmū sangī* in the group of “mandarin-limes.” From his technical description the following quotation is particularly germane: “It is much multiplied [in Persia], particularly as a rootstock; the multiplication is generally done by cuttings. Its fruit is depressed globose, with a yellow-orange rind, and an areola which is very distinct and deep. The very special odor of its peel essence is reminiscent of Rangpur or Yellow Rangpur lime.” The *bakrāʾī* is not grown at all in the Caspian zone. Reportedly, the fruit is used locally primarily for medicinal virtues similar to those attributed to the *līmū šīrīn*. As a rootstock, it is reported by Reuther from Ḵūzestān and Fārs (pp. 22, 27). In Fārs it is among the principal citrus varieties grown, and plantings on its stock are common, especially in Darab (p. 32). Reuther has observed, however, that in Dārāb, “with the widespread of *bakrāʾī* stock, [citrus fruits] in most commercial orchards . . . were affected to some degree with lime-induced chlorosis or iron and zinc deficiency” (p. 33).

As for the etymology of the name *bakrāʾī*, Pūr-e Dāwūd (pp. 89-90) argues unconvincingly that it is derived from the Aramaic *bakrā* used as an ideogram for Pahlavi *tarrag* (vegetable).

Among citrus fruits the mandarin is second only to the sweet orange in popularity and consumption in Persia. Some minor uses for its peel are also mentioned in cookbooks (e.g., Ḥekmat, pp. 53, 61-63, 103; Montaẓemī, pp. 600-01).

6. *Citrus grandis* (L.) Osb. (= *C. decumana* L., *C. pamplemos* Risso, *C. maxima* [Burm.] Merr., etc.), the shaddock (or pompelmous, pummelo, etc.). The probably numerous varieties and/or hybrids of this species in Persia have not yet been comprehensively studied and scientifically identified, partly because of their very limited cultivation and their very marginal commercial importance. The unusual diversity and complexity among the members of this group, which have resulted in a plethora of vernacular names and synonyms, have been scientifically explained by Chapot (p. 92). Chapot's description of the fruits in the shaddock group, despite its lack of comprehensiveness and certain other shortcomings (e.g., failure to mention the provenience of individual varieties in Persia), is so far the most nearly complete. He names and partly characterizes the following varieties and hybrids (pp. 94-97): *ʿAbbās-qolī-ḵānī* (probably the fruit some authors have called *ʿabbāsī*), *Batābī* (see below), *bočī-bočī*, *dārābī* (so called because it probably originated in Dārāb, in Fārs), *mīān-banafča*, and Tchape (*čapa*?). Chapot has also described three "presumed hybrids of the shaddock and the lemon: the *otroj*, the *bālang* (see above), and the *Bitrouni* [*bītrūnī*?], which looks a little like the *otroj*, but with a little smoother rind."

Other varieties or probable hybrids of the shaddock, unnamed by Chapot but mentioned in other sources, include the *tū-sorḵ* (lit. "red inside"), *tū-sabz* (lit. "green inside"), *solṭān(-e) morakkabāt* (lit. "sultan of citrus fruits"), *tah-bošqābī* (lit. "like the bottom of a plate"), and *mīnā*. Whether or not some of these names are vernacular synonyms of the above-mentioned varieties or local varietal designations cannot be ascertained without detailed study of the fruits of the shaddock group in Persia. Most varietal designations of the shaddock appear to be of (dialectal) Persian origin; the only one that is designated by a loanword, which suggests the original provenience of the shaddock, is *batābī* (with its local variants *patāb/vī*, *b/pātāvī*, *pātābī*, *partābī*), which clearly suggests an origin in Batavia (former name of Jakarta, capital of Indonesia), where two of the best pink-fleshed varieties of shaddock are still produced (Pūr-e Dāwūd, pp. 88-89; Reuther et al., p. 534). The *batābī* was probably the first variety of shaddock introduced from India into Persia (Balfour, I, p. 737; cf. Bengali *batabi*, Hindi *batāwī-nimbū* "Batavia lemon"; see Platts, s.v.; Dymock et al., I, p. 270; cf. *līmū hendī* "Indian lemon," recorded by Pārsā, I, p., 1527). Chapot (pp. 94-95) considers it "a typical shaddock" in all respects (form of the fruit, color of the rind, odor of the essential oil, pink pulp, numerous seeds, and so on). The typical or genuine shaddock is large or very large (ca. 12 cm or more in diameter), but there are varieties producing fruits "the size of a

human head." In form it is subglobose or round, pyriform in some varieties. When mature the fruit rind is light yellow and generally quite thick (1.5-3 cm in some varieties). The pulp, which may be pink, yellow, or white, is divided into between eleven and seventeen segments, with large, thick seeds (*How to Identify*, pp. 17-18, including full-sized drawings of different parts of a shaddock in Persia).

Further information about varieties of shaddock in Persia and their names is fragmentary, imprecise, and sometimes discordant. Moʿayyer-al-Mamālek mentioned the *patābī*, *dārābī*, and *tū-sorḵ*, apparently as three distinct citrus varieties, in the royal orangeries (pp. 41-42). Ṯābetī (p. 232) has briefly described only three varieties. The first was the *solṭān(-e) morakkabāt*, the *Citrus decumana* Murray var. *macrocarpa* (sic; probably meaning *C. decumana* L. var. *macrocarpa* Murray). It is a very large but useless fruit; its tree is occasionally found in the gardens in the Caspian zone. The second, *tū-sabz*, *Citrus decumana* Murray var. *piriformis* (sic), is pear-shaped and has a pistachio-green, juicy, acid pulp and a thick, spongy rind that is uneven on the outside. It is called *pošqābī* in some places in the Caspian zone. The third variety was called *dārābī* (*C. decumana* Murray var.? [sic]) everywhere in the Caspian zone; it also has a compact round fruit with a smooth rind, a dry yellow pulp, and a taste like *mey-ḵᵛoš* (for more, and usually confusing, information, see Chodźko, tr.; Mel'unov, tr. Golzārī; Fakrāʾī, p. 157; Clément-Mullet, pp. 24-25, 32-33, 39-40; Watson, pp. 48-49).

Citrus paradisi Macf. (= *C. decumana* L., var. *recemosa* Roem., etc.), the grapefruit, commonly called *gereypfo/erūt* (with several popular distortions) in Persia, is the latest citrus species introduced into the country. Ebrāhīmī (1359 š./1980, pp. 43-48) has reported the chronology of the importation of its varieties. Marsh seedless and Duncan varieties were imported in 1309 Š./1930-31 and grown in Rāmsar as an experiment, but they were confined to that area until 1329 Š./1950-51, when scions of Marsh grapefruit were sent to the Ahvāz citrus experiment station; there they remained "an unknown variety for fifteen years." After the freeze of 1342 Š./1943-44, however, Shambar, Redblush, and "red grapefruit" varieties were imported from California, and in 1351 Š./1972-73 Frost Marsh, Redblush, and a few other varieties were imported from Morocco for propagation by Sāzman-e ʿomrān-e Jīroft (for a listing of all the imported varieties, see Ebrāhīmī, 1359 Š./1980, pp. 43-48). In 1976 Reuther (p. 4) observed that in Persia "grapefruits are mostly Marsh seedless and Redblush, and are confined almost exclusively to southern

Iran"; he reported them from Dārāb, Bam, Jīroft, and Mīnāb; pp. 32, 38-39, 41, 44). Furthermore, the shaddock is botanically so closely allied with the grapefruit that many *Citrus* taxonomists consider the latter simply a variety of shaddock (Reuther et al., I, p. 383), and the general public in Persia usually confuses the two.

The grapefruit is sought mainly for its reputed dietetic or medicinal properties; hence its comparatively limited cultivation and the small demand for it in Persia.

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