

Arboriculture in ancient Iran: Walnut (*Juglans regia*), plane (*Platanus orientalis*) and the “*Radde dictum*”

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“Were it not for the plane-trees, one might overlook Teheran as one would a sleeping crocodile on the banks of the Nile” (Arnold 1877: 162).

The British zoologist R.W.T. Günther (1869-1940) visited Azerbaijan from mid-July to mid-September, 1898, “for the investigation of the fauna and flora of the great salt lake of Urmi...as well as of the relations of that fauna and flora to its environment” (Günther and Manley 1899: 312). A natural history polymath, Günther made the following observation which forms the starting point for this note: “I did not see any specimens of the Oriental plane [*Platanus orientalis* L., NPers. *čēnār*] or of the walnut (*Juglans regia*) [NPers. walnut, *gowz/jawz*] which could unhesitatingly be described as wild or indigenous in the Urmi district. I am therefore inclined to consider that Dr. Radde’s dictum that all planes and walnuts in the Caucasus have been planted by man, with the possible exception of the walnuts of Gilan, is equally true of the Urmi district” (Günther 1899: 350-351).

This statement was unrelated to the main thrust of Günther’s work and may appear arcane to many readers. Yet, in fact, it highlights an issue of enormous interest to 21st century students of ecology, botany, palynology, plant genetics and forestry, even though none of the recent papers consulted in the preparation

of this study acknowledge what Günther termed “Dr. Radde’s dictum.” Like Günther, Gustav Radde (1831-1903) was also a polymath. He made profound contributions to the study of botany, zoology, ornithology and ethnography, particularly in Siberia and the Caucasus, and established the world famous Caucasian Museum in Tblisi in 1866 (for his long and distinguished career see Kropotkin 1903; Blasius 1904). Radde published extensively on the botany of the Caucasus and the adjacent parts of Iran noting that, despite having looked throughout the Caucasus for 17 years, all of the walnut trees that he saw were anthropogenic in origin, growing only “wirklich wild in Gilan,” and the same applied to the plane tree, every specimen of which he encountered had been planted by human agency (Radde 1881: 170; cf. 1886: 410-11; 1899: 182, 189). Wherever he saw walnut trees, he wrote, they stood either in the neighborhood of current settlements or where the ruins of remote monasteries and churches had been, generally in association with water courses. To be sure, Radde was not the first scholar to draw this conclusion. The German botanist Karl Koch (1809-1879) noted that, during two stays in the East (1836-8, 1843-4), he had particularly devoted himself to determining the “Vaterland der Platane,” concluding that all of the plane trees he saw were cultivated, occurring always in association with human settlements. This agreed with the observations of Carl Haussknecht in both Asia Minor and Iran, and Koch dismissed the identification of wild stands of plane trees by non-botanists as mistaken (Koch 1879: 78-9; cf. Jaenicke 1899: 160). Similarly, the Russian botanist Yakov Sergejevich Medvedev (1847-1923) disputed the wild nature of the walnut in the Caucasus, finding what he considered uncultivated specimens only in the Talesh (Köppen 1889: 58-9). Be that as it may, the Radde dictum may be summarized in the following way: despite the fact that the “native range” of the so-called Persian or English walnut during the Holocene extended from Switzerland and southern Europe (Slovenia, Italy; see Pollegioni et al. 2017) to western China (Ali et al. 2016: 50), all plane and walnut trees encountered in the Caucasus (and Iran), with very few exceptions (e.g. in Gilan or Talesh), resulted from intentional arboriculture, not spontaneous growth.

The ancient and mediaeval literature, from Herodotus and Marco Polo, through Della Valle, Chardin, Olivier and Ouseley, is replete with references to enormous, centuries-old and venerated plane trees across Iran (see e.g. the citations in Ritter 1844: 411ff.; Yule 1871: 128) and, of course, according to Herodotus (*Hist.* 7.31) and Aelian (*Var. Hist.* 2.14) (Ouseley 1819: 380-5), Xerxes famously honored a plane tree, an episode immortalized in Handel’s famous aria “Ombra mai fu” (“Ombra mai fu / Di vegetabile / Cara ed amabile / Soave più;” translated in the original printed libretto as “No, never vegetable made / A clearer and a lovelier shade” (Locke 2009: 58) in his 1738 opera *Serse* (Stubbings 1946: 67).

Many observers of gigantic plane trees have made the effort to measure them. Olivier determined (Olivier 1807: 102) that a large plane tree in Tehran had a circumference approaching 69 feet (= c. 22.41 m., using the French royal foot of .324839 m.; see Guilhiermoz 1913: 276). Fraser saw a plane tree at Jaffarabad, about 24 mi. (38.62 kms.) from Tehran, that measured 7-8 ft. (c. 2.1-2.4 m.) in diameter (Fraser 1838: 67) and MacGregor reported a plane tree at Dasht-e Piaz between Bijan and Mashhad with a diameter of c. 12 ft. (3.66 m.) (MacGregor 1871: 120). According to Petzholdt, a plane tree at Ordubad, east of Julfa, in Nakhjavan, had a circumference of 38 ft (11.58 m.) (Petzholdt 1866: 161; cf. Russell 1987: 69, n. 117, who put its diameter at 15-20 ft. (c. 4-6 m.), based on a photograph taken before the Russian Revolution). Jane Dieulafoy reported on the famous plane tree of Tajrish in the Bagh-e Ferdows, the trunk of which measured 15 m. in circumference (Dieulafoy 1887: 158; the same tree referred to above by Olivier?). Since tree rings grow annually circumference is, of course, a direct reflection of age. Loti commented on the plane trees of the Chahar Bagh boulevard linking Isfahan and Julfa, suggesting they were over 300 years old (Loti 1900: 205). Plane trees with estimated

ages of 1250 years (Kamna, circumference 16.5 m.); 1300 years (Natanz, circumference 7.8 m.); and 1500 years (Shamirzad, 15 m.) have been recorded in Iran (A'lam 1990). When he was in Isfahan Jean Chardin reported seeing a large plane tree “qu'on appelle semblablement *le platane du roi Hassein* qu'on dit vieux de plus de mille ans” (Chardin 1711: 186; cf. Ouseley 1819: 373). At Armia in Khorasan Jackson saw “an immense plane-tree, which the natives claim to be several thousand years old, and whose enormous branches are fabled to shade the grave of the prophet Jeremiah” (Jackson 1911: 204).

As for the walnut, Koch declared in 1875 that Iran was “das Stammland der Wallnussbäume” (Koch 1875: 34), a view repeated recently by Arzani et al. who insist that “the walnut originated in Persia” (Arzani et al. 2008: 159). Bearing in mind Radde's dictum, then, what is the antiquity of plane and walnut cultivation in Iran? Although general studies have been published on the woodlands of the ancient Near East (e.g. Rowton 1967), none, with the exception of some recent, palynological investigations of specific locales, deal specifically with Iran. Considering the importance of both walnut and plane trees in Iran over the centuries, it is worth investigating their presence and earliest appearance more closely.

The evidence of plane and walnut in ancient Iran is principally palynological and, for walnut, archaeological evidence exists as well. Limited epigraphic evidence is also available. To begin with, let us consider the palynological evidence concerning both species. Moving from north to south, five relevant pollen sequences — from Lake Urmia, Lake Almalou, Lake Zeribar (often written Zeribor but as palynologists and palaeoclimatologists consistently use Zeribar, this form is used here), Lake Maharlou and Lake Parishan — are relevant to this question.

Lake Urmia

In discussing evidence of human influence in the Lake Urmia core, Bottema noted that, “Subzone Z-4... is characterized by the presence of *Juglans* and *Platanus* pollen” (Bottema 1986: 245). The absolute date of Z-4 is unclear, however. Using early radiocarbon dates from lower down in the core, and assuming a regular rate of lakebed sedimentation, Bottema and Woldring argued that this would imply that “the beginning of zone Z4 [is] to be dated to a mere ca 2000 years BP. This would seem too young. If core 21 is considered, indicative types as *Juglans* and *Platanus* are already present at a depth of over 100 cm” (Bottema and Woldring 1990: 251). However, van Zeist later suggested that “Subzone Z4 shows an almost continuous *Juglans* curve as evidence of human activity and for that reason can be compared with subzone 7c at Zeribar” (van Zeist 2008: 100) which, as discussed below, dates to c. 2700-2000 BP or c. 700 BC to the time of Christ (Iron Age, Achaemenid, Seleucid/early Arsacid periods).

Lake Almalou

Lake Almalou is located to the east of Lake Urmia. Noting that, “The low pollen production of *Juglans* and notably *Vitis*...implies that even very low pollen values of these trees may indicated a cultivated origin,” Djamali et al. suggest that, “In the Almalou region, the first large-scale tree cultivation phase is observed at about 1500-1250 cal BP” (Djamali et al. 2009a: 1372-3). Thus, the Almalou core implies walnut cultivation for the first time in the late Sasanian and early Islamic era, c. 500-750 AD.

Lake Zeribar

At Lake Zeribar “a date of c. 2,700 B.P. was calculated for the subzone 7b/7c transition” (van Zeist and Bottema 1977: 59). Writing about subzone 7c, van Zeist and Bottema noted, “*Juglans* must have been

introduced by the people who inhabited the Lake Zeribar area during sub-zone 7c time. This fruit tree occurs in a wild state in the Euxinian forests to the south of the Black Sea and in the Hyrcanian forests to the south of the Caspian" (van Zeist and Bottema 1977: 75; cf. Jafari Sayadi et al. 2012). Later, however, Bottema suggested that, based on the evidence from Lake Zeribar, "*Juglans* appears only about 2000-2500 B.P." (Bottema 1980: 344; cf. Wasylikowa 2005: 729).

Lake Maharlou

The Maharlou evidence is much earlier than that from Lakes Urmia, Almalou and Zeribar. In an earlier paper Djamali et al. suggested, based on the pollen evidence from Lake Maharlou, that "large amounts of *Pistacia* and cultivated tree pollen (*Juglans*, *Platanus*, *Olea*)" began c. 4000-2800 BP (Djamali et al. 2009b: 130). Later, they amended their dating and wrote, "The first significant anthropogenic event in the Maharlou pollen diagram seems to be the small peak (1.4%) of *Juglans* pollen dated to ~2500 BC with its next appearance at ~1100 BC...By 1900 BC the first traces of *Platanus* pollen appears (sic)...The aggregated curve of pollen types attributable to the cultivated trees (i.e., *Juglans*, *Platanus*, *Vitis* and *Olea*) becomes continuous at ~1200 BC...and starts increasing at ~700 ...The curve shows a prominent peak at around 500-600 BC, suggesting that tree cultivation culminated at the time of the Persian Median and Achaemenid Empires" (Djamali et al. 2011: 177; cf. Djamali et al. 2016: 256). Djamali and his colleagues also suggest that "higher elevation plains and mountain areas around Lake Maharlou seem more suitable for walnut" than, e.g. olive, which is attested in the Lake Parishan pollen profile during the Achaemenid period (Djamali et al. 2016: 265).

Lake Parishan

The evidence from Lake Parishan shows a "spike in pollen from cultivated trees (primarily *Olea* and *Platanus*) in the LPIII core at 120 cm" which "coincides with the rise of the Achaemenid Empire" (Jones et al. 2015: 9).

To sum up, the pollen data discussed above yields the following approximate chronology of early plane and walnut arboriculture in Iran:

Platanus orientalis L. — 1900 BC (Lake Maharlou), 1200 BC (Lake Maharlou), 700-0 BC (Lake Urmia), Achaemenid (Lake Maharlou, Lake Parishan)

Juglans regia L. — 2500 BC, 1100 BC, Achaemenid (Lake Maharlou, Lake Zeribar), Seleucid/early Arsacid (Lake Zeribar), 500-750 AD (Lake Almalou)

The evidence provided by these pollen diagrams may now be compared with that of other sources. For example, plane is attested by the late third millennium BC in Mesopotamian cuneiform sources (Sum. ^{gis}tu-lu-bu-um, Akk. *dulbu(m)*, Syr. *dulbâ* and Ar. *dulb*; see Campbell Thompson 1949: 289; Löw 1881: 107). Around 2100 BC Gudea of Lagash used plane tree and fir wood to construct rafts in order to bring, among other things, plane tree (logs?) to southern Mesopotamia from the north (Mt Ebla, i.e. Syria), and plane tree wood was used to make tables at Ur shortly thereafter (Neumann 1979: 66). Later, boxes or trays of plane wood are attested at Nuzi, in northern Iraq (for refs. see *Chicago Assyrian Dictionary* D: 172 s.v. *dulbu*), which is conventionally dated to c. 1450-1400 BC (Friedmann 1981: 109). Plane trees, planted by the Urartian king Rusa I at Ulhu, are mentioned in Sargon II's account of his destruction of the town in 714 BC (for the text see Thureau-Dangin 1912:35, l. 206 and Mayer 1983: 89). Ulhu has been plausibly identified with the site of Qalatgah, just south of Lake Urmia (Muscarella 1986: 469). Quintus Curtius mentioned that plane trees and poplars grew along the

Araxes river bank on the Persepolis plain (*Hist. Alex.* 5.4.6-7). In *De Plantis*, written by Nicholas of Damascus during the 1st century BC, and known in a Latin translation of an Arabic version made by Alfred of Sareshel in the 13th century, the grafting of plane, using the name *Adul*, from Arabic *ad-dulb* (Meyer 1841: 93; Pease 1933: 68), is attested, but this reference, although highly interesting, is not geographically precise.

As for walnut, the Sumerian and Akkadian words for walnut are unknown. Postgate suggested that, of the unidentified names of trees attested in Akkadian sources, *šušūnu* could be a candidate for walnut (Postgate 1987: 131) but this remains uncertain. Archaeological evidence exists, however. Writing boards made of walnut wood were discovered at the Assyrian capital Nimrud in 1953 (Wiseman 1955: 3), and a walnut dagger handle of Neo-Babylonian date was found at Uruk (van Ess and Pedde 1992: Taf. 103b-c). Pliny famously wrote, “The Greek names for the walnut prove that it also was sent us from Persia by the kings, the best kind of walnut being called in Greek the ‘Persian’ and the ‘royal,’ and these were their original names” (*Nat. Hist.* 15.24.87, “et has e Perside regibus translatas indicio sunt Graeca nomina: optimum quippe genus earum Persicum atque basilicon vocant, et haec fuere prima nomina”). Finally, in 1994 walnut shells were found in the salt mine of Douzlakh, Chehrabad, in association with Salt Man 1, dated by radiocarbon to c. 1700 BP, or the early Sasanian period (Aali et al. 2012: 64). In later historical times both walnut and plane timber were used in Iran to manufacture a wide variety of goods (Floor 2003: 300-1; 2006). As Günther noted at the end of the 19th century, “Walnut-wood is in great request for the best joinery and cabinet-making” (Günther 1899: 350-351).

Conclusion

The pollen data reviewed above demonstrate that walnut and plane were present in Iran as early as the mid-3rd and early 2nd millennia BC, respectively, and this, combined with the cuneiform evidence from nearby Mesopotamia, as well as scattered archaeological material, indeed suggests that Iran’s priority as a center for both plane and walnut arboriculture is well-justified. With respect to the Radde dictum, with which this paper began, no evidence accumulated since the 19th century when Koch, Radde and other botanists published their views on the anthropogenic nature of virtually all *Juglans* and *Platanus* in Iran and its western neighbors has been found to challenge that view. Indeed, a recent study of pollen and charcoal from lakes and peat bogs in Kyrgyzstan has, yet again, upheld the Radde dictum by showing that walnut has only been present in this region for, at most, 2000 years (Beer et al. 2008), and analyses by Pollegioni et al. (2015, 2017) and Ebrahimi et al. (2016) reach the same conclusion based on European and Asian evidence, while Laufer had stressed the Iranian origins of walnut in China nearly a century ago (Laufer 1919: 254-75). Much scholarship on Iran treats the great royal garden of Pasargadae (Stronach 1989, 1990) as a precocious marvel of arboriculture that presaged Iran’s later flourishing garden culture (Gharipour 2013). A marvel it may have been, but not necessarily precocious, at least in the sense that the history of plane and walnut planting in Iran seems to be of much greater antiquity. Palynologists have immeasurably contributed to our perception of when the cultivation of these two tree species first appeared in Iran, opening a window on periods otherwise unrepresented by epigraphic, archaeological or literary sources. This deep history of arboriculture, both as an economic activity and an enhancement of the human environment, continued as a *leitmotif* throughout Iranian history. Gustav Radde and others have pinpointed walnut and plane, two species beloved by Iranians, as cultural, not merely botanical, exports to both the east and the west and the Radde dictum, adumbrated almost 150 years ago, remains as true as ever.

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