History of Sesame Cultivation and Irrigation in the Armenian Highlands from the Kingdom of Urartu (Ararat) through Subsequent Periods

Major Agricultural Innovation

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AGRICULTURAL BACKGROUND, ENVIRONMENT, AND GEOGRAPHY OF IRON AGE URARTU (ARARAT)

Our earliest domesticated crops of the Near East Fertile Crescent—barley, chickpea, flax, lentil, pea, vetch, and wheat (Harlan 1992, 1995; Zohary and Hopf 2000)—soon spread to neighboring lands, including southern Caucasus. Akin to their wild progenitors that grow mainly on dry hill slopes during the period of winter rainfall and ripen around May (Zohary 1969), the Near Eastern complex was normally planted in late fall, as winter crops (Sherratt 1980).

Van Zeist (1969) indicated that those cereals and legumes complete their vegetation cycle before it becomes hot; in Kuhrt’s (1995) view, the maturing season for these crops varied from April to July in highland areas of Iran. Columella’s On Agriculture (1960), a mid-1st-century-AD farmer’s handbook that understood micro-regions, advised: “Flax-seed … is particularly hurtful to land. For this reason, it requires a soil which is very rich and moderately moist. It is sown from the first of October to the rising of Aquila, which falls on the seventh day before the Ides of December [Dec. 7].” Therefore, greater summer dryness would not affect these species.

North of Assyria in eastern Asia Minor there existed (Van De Mieroop 2004): “one of the most enigmatic important states of the ancient Near East: Urartu. While it is clear that it played a crucial role in the first half of the first millennium, and at one point was the most powerful state in the region, the reconstruction of its history is extremely difficult.” Most of the information we have is culled from Assyrian accounts, which also provide the only chronological framework we have. They mention Urartian rulers only in conflict situations.

The Iron Age kingdom of Urartu was located between the Eastern Armenian Plateau, northwestern Iran, and the Caucasus, reaching from the Caspian to the N-S bend of the Euphrates, from the small buffer state of Musasir in the southeast, to Hamath and Alalakh on the Orontes (Chahin 1996). The kingdom of Urartu eventually expanded into an empire that engulfed the entire eastern half of Asia Minor and the lands surrounding Lake Van, reaching to Lake Sevan and the northwestern corner of Iran around Lake Urmia. This was a region subject to violent earthquakes and that possessed enormous deposits of iron ores, copper, and silver. Urartu also held sway over many of the city-states of northern Syria and the Levant, forming a political system that rivaled even Assyria in its magnitude (Zimansky 1985, 1995). Urartians owed much of their prosperity to copper and iron mines, and they have left a distinctive repertoire of metal objects, pottery, and jewelry, as well as durable irrigation canals. Geological and archaeological scientist-explorer Jacques de Morgan’s Mission Scientifique au Caucase (1889) viewed this county the place where the ancient people of present-day Armenia began ironworking (“les peoples antiques de l’Arménie actuelle débutaient dans l’art de travailler le fer”).

By the 17th or 16th century BC, Babylonians knew of the Armenian Highalnds as the land of Urdhu (possibly the contracted form of Urardhu) (Chahin 1996). That name is also found in the Qumrurn “Dead Sea” texts as (H)urartu. The people who had been settled there since ca. 2400 BC were Hurrians (as were the later settlers in northern Mesopotamia, whose rulers were the aristocratic Mitanni). The earliest appearance of the name Urartu is in Assyrian inscriptions around 1250 BC, indicating the geographical area between the lakes Van, Sevan, and Urmia, where the frontiers of Turkey, Iran, and the former ASSR meet (Garbrecht 1980). Figure 23.1 shows a map of the kingdom. Harassed by northern Assyrian campaigns, the Hurrian tribes living in the Armenian Highlands amalgamated around 850 BC to form the Kingdom of Urartu (Biblical Ararat).

Their first king was Arame (ca. 858–844), who gave his name to the Armenians who succeeded the Urartians in the area. Zimansky (1998) presents an annotated bibliography of sources regarding Armenian ethnogenesis, and evidence of continuity of language, religion, and material culture, metallurgy in particular. During the reigns of thirteen successive kings between 850 and 600 BC, while constant battles were fought against the great power of Assyria, Urartu rose to a leading position in the Near East, but according to certain historians, eventually fell in 595 BC following an assault by
Figure 23.1  Map, Iron Age Kingdom of Urartu.
the Scythians and Medes. The height of Urartian power arose during the period between 830 and 730 BC (Garbrecht 1988).

High mountains and narrow valleys, with rivers that do not form a sequential system, characterize the territory of Urartu. The headwaters of many rivers originate there, but they flow in all directions, and only the Euphrates is navigable (Van De Mieroop 2004). The original center of the state was Lake Van, whose waters are too saline for drinking or agriculture.

The Armenian Highlands experience temperature extremes and periodic droughts. Winters are long and harsh. Historian David Lang (1970) indicates: “It is not always realized that the climate of much of the Urartian territory is more akin to that of Siberia or southern Canada than to that of nearby Mesopotamia. The winters are long and severe, with snow lying to a depth of several feet for at least four months, with consequent immobility of the population and comparative isolation of each community from its neighbors.”

Summer temperatures are as high as in tropical deserts; aridity is severe. Erinci and Tunçdilek (1952) distinguish three sub-regions: Kars-Erzerum, where soil is particularly fertile and irrigation is not used; Araxes Valley, which is lower and warmer, where irrigation is required; and the Van-Tunceli region, where aridity is extreme and agriculture is limited except in the depression surrounding Lake Van, where there is intensive irrigation. “There is no reason to contend that the climate was significantly different in the Urartian period” (Zimansky 1985).

Zimansky (1985) depicts the climate of Urartian lands reported by an eyewitness: “Europeans who visited Khvoy in the 19th c tended to be quite enthusiastic about the fertility of the lands which surrounded it, praising both its gardens and its grain-growing capacities. This productivity, which is still manifest, is not due to any abundance of moisture—Khvoy is the driest meteorological station on what was once Urartian territory. Annual precipitation here is less than half of what falls on Van and Urumiyh ... A relatively damp May, early-maturing crops, and irrigation water from the Qoţūr—which has its sources above the 2,400 m level in the mountains 53 km E of Van—are what make agriculture possible here.” Regarding “Erevan and the plain of Ararat” between Mt. Ararat and Aragac: “The Aras plain broadens to a width of more than 35 km, creating the greatest single expanse of arable land in Urartu’s domains. The Aras itself splits into several channels to water this plain, and other rivers from the surrounding mountains supplement it in this task. Although the annual rainfall is considerably greater than at Khvoy, irrigation is equally essential here. Compared to Van, winters are quite dry, and spring rainfall is not enough to carry crops through the arid summer. The mountains north of the valley, however, enjoy considerably more precipitation than those in more southerly parts of Urartu, and consequently more water from runoff is available to the cultivators of the valley.”

At the time of settlement (9000–6000 BC), the cultivation of plants remained a rather precarious business for climatic reasons, and was therefore inadequate as the sole source of basic subsistence (Nissen 1988). Harris (1969) advised: “The agricultural utilization of a natural ecosystem may be accomplished by manipulation rather than transformation ... by altering selected components without modifying its overall structure.” With iron plows, spades, axes, sledges (Muhly et al. 1985), and irrigation, land could be farmed much more intensively, that is, greater yields could be achieved from a given area per unit of human labor with larger surpluses than by dry farming.

This account compiles a widely dispersed literature, published in assorted languages, that describes the contributions of little-known vanished autochthonous populations, subjects of complex political circumstances (Smith 2005), whose introduced crops made significant contributions beyond subsistence to the economy of their time. It connects archaeological evidence (seed remains) and material culture with environment and economy, resurrecting an ancient history, now nearly lost.

**URARTIAN INNOVATION I: IRRIGATION TECHNOLOGY**

Southern Caucasia includes the highland Middle Araxes River and its drainages. Average elevation is between 1,200 and 1,800 m above sea level, dipping below 1,000 m only in the Ararat plain.
Summers are hot, dry, and short, while winters tend to be long and harsh, with moderate accumulations of snow (Hewsen 2001). Cultivation is difficult in the region without irrigation, as rainfall is generally light (annually 150–300 mm) in the Ararat plain and concentrated in the spring (Smith 2005). Irrigation historically has concentrated as much on the capture and storing of snow-melt as the exploitation of river systems, since the latter tend to rest at the bottoms of deep gorges. To expand this area, diverted surface water could reach a wider area by means of diversion dams, and a better use of rainfall would enable adaptation to dry conditions. Both required additional labor, for canal construction and soil preparation. This required effective management of a sizable labor force.

Artificial irrigation and water control systems have a long history in the southern Caucasian countries. At the third-millennium-BC site of Moghrablur, Armenia, stepped dams and sluices of mud-bricks faced by reeds and wooden panels reduced the velocity of rushing water from the mountain, and then fed the water through simple channels onto the fields (Issar and Zohar 2004). Scattered on the southern slopes of Mount Aragatz, artificial ponds, remnants of stone dams, date to the 15th–14th century BC. These barrages, linked to each other and to a complex network of canals, controlled and directed the run-off water from gradually melting snow on top of the mountain to the bottom of the Ararat Valley.

Intensification of agriculture by the construction of large-scale irrigation works became common from the first millennium BC. An economy thus organized, anchored in food production, enabled the kingdom to achieve the highest yields, and two or three harvests per year could be grown. In excavator Charles Burney’s (1972) view: “Shortage of water can arise from growth in population or from decline in rainfall (or, more precisely, in annual precipitation, since in the highlands the water supply depends so much on the melting snows). These are the stimuli to the digging of canals and reservoirs and the construction of dams and cisterns, the subject of much activity by successive Urartian kings. Among them Menua (c 810–786 BC) has left the greatest number of inscriptions; but later kings of Urartu are also known to have been energetic irrigation engineers. There is perhaps a third factor encouraging such works, which may be termed political. A ruling dynasty could have no surer means of securing popularity than by the construction and maintenance of canals to bring water to the fields and gardens.”

In Nissen’s judgment (1988), there is a considerable difference between this type of agriculture and dry farming. More labor was required, and the organizational challenge was greater. Irrigation had many effects on agriculture, reconfiguring patterns of settlements and politics caused by the switch from a land on a broad plain interlaced with countless watercourses, to a situation in which canal systems, branching off from one or two rivers fed by snowmelt, irrigated the land. In this way, organization of food production was efficient, making it possible to feed more people from the yield of a given area, a difference that had far-reaching consequences.

The Urartian empire appears to have adopted multiple strategies of agricultural production: dry-farming areas within the marginal steppe lands were opened up for what must have been relatively low-yield rainfed cultivation; and areas nearer the capital, especially Tuşpa and Teishebaini, were irrigated, in order to increase yields above those obtainable under rainfed cropping. In the most marginal areas where rainfed cultivation was ineffective, large-scale canal systems brought large areas of new lands into irrigated production, lands that had hitherto seen little or no significant agriculture. The irrigation systems near the imperial capitals both increased agricultural production and made a statement of imperial strength to demonstrate that the king controlled large and geographically diverse territories. This message was manifest in lush gardens filled with exotic, imported plants. Furthermore, the hydraulic works eloquently demonstrated that the king was capable of impressive feats such as diverting rivers, mobilizing large quantities of labor, and erecting large monuments in both countryside and town (Wilkinson et al. 2005). This work required a large labor force, and it is likely that the intention of many of the military expeditions was to gather people for these tasks.

Increased yield allowed more dense settlements, and with multiple high-yield harvests each year, the kingdom of Ararat became a flourishing exporter of grain, along with timber and metal. Rich in raw materials, it became a successful producer of luxury goods and engaged in international trade.
“Under Menua (810–785) Urartu took effective control of the lucrative caravan routes between central and southeastern Asia as well as Elam to the Mediterranean and the Black Sea, causing them to pass through its territories rather than through Assyria as before” (Sicker 2000).

Supplying the kingdom’s capital Tuşpa/Rusahinili, situated on alkaline Lake Van, with drinking and irrigation water is an outstanding example of a “well-planned and excellently built historical inter-basin water management project” (Garbrecht 1988). That settlement could survive on a permanent basis only if they had laid a watercourse that provided water throughout the year. Urartian texts reveal that successive kings dug vast irrigation canals and built reservoirs to increase the country’s fertility and supply the towns. Remnants of the walls of Shamiram-su, which carried fresh water along King Menua’s 70-kilometer-long irrigation canal, from the Hoşap Valley about 14 km south of Tuşpa, to Van, bear several inscriptions (Burney 1972; Garbrecht 1980; Lehmann-Haupt 1926; Piotrovsky 1988) and represent the oldest known Urartian irrigation work (Zimansky 1985). Piotrovsky (1988) adds: “In some places the water flowed along aqueducts 10 to 15 m high. Irrigation farming with its high and stable harvests was apparently intended by the Urartu government to be the basis of the country’s economic might.” The system has been in operation for more than 2000 years and still serves, at least in part, its original purpose.

Burney (1972) detailed further: “Another district whose supply Menua improved was that of Erçiş, on the north-east shore of Lake Van, where he dug a canal ending in the River Dainali, probably the modern Zilan Dere, just west of Erçiş. He seems also to have irrigated the small but fertile plain at the north-east extremity of Lake Van, the district commanded by the fortress of Körzöt. Four inscriptions record the construction of canals in the vicinity of Malazgirt (Manzikert), where there are large springs giving easily available sources for the irrigation of the open land of the upper Murat valley. Very probably, the traces of a small canal west of Bulanik observed during the above-mentioned survey in 1964 can also be attributed to Menua. … Argishti I recorded his construction of four canals to bring water to an arid stretch of the Araxes valley, where he had founded two fortresses at Argishtihanili (Arnavir-Blur). Vineyards and orchards were planted on land previously desert. Sarduri II continued this dynastic tradition by planting a vineyard near Erçiş, perhaps on the site of one seen there today.”

Rusa II (ca. 685–645 BC) seems to have been the founder of Rusahinili, the citadel of Toprakkale, the center of his improvements to the capital of Van. He provided a complex network of diversions of existing watercourses linked to an artificial lake (Keşiş Göl), which he named after himself, to supply water to the citadel with a canal to the new city. It also irrigated the vineyards, trees, and barley fields planted at the foot of Toprakkale, thus benefiting Van as a whole and augmenting the supply from the Menua Canal. The great inscription that proclaimed his achievement specified that it served vineyards, orchards, and vegetable gardens (Garbrecht 1980).

At Toprakkale itself, a large cistern, fed by a small channel through a porthole entrance, was cut out of the solid rock. Similar plantations—vineyards, trees, orchards, and barley—were made possible, according to another inscription of Rusa II, by his making a canal from the River Ildaruni, probably the modern Hrazdan.

From atop Yerevan’s excavated Red Mound (Karmir Blur in Armenian) of Teishebaini, there is a sweeping view of the landscape spreading below; the great rampart is strategically sited on a bluff beside the winding Hrazdan River gorge, ca. 6 km southwest of Yerevan city center. A stele found in the ruins of the medieval church of Zwartnots near Yerevan is inscribed: “Rusa Argishtihini speaks: In the valleys of Kuturlini there was no cultivated land. By the command of the god Khaldi, I have planted these vineyards, I have sown the fields with corn and I have laid out all the orchards, and surrounded the whole with towns.” The administrative center held huge storage areas for grain and wine. Agricultural productivity increased through construction of canals, some of which are still in use today (Chahin 1987; Piotrovsky 1988). The canal serving Teishebaini, fed by the Hrazdan River, emerges into the surrounding fields from a tunnel bored through the solid basalt rock at the foot of Teishebaini’s city wall, another proof of the engineering skill and craftsmanship of the Urartians. Its economic impact was profound. Piotrovsky (1988) indicates: “According to tentative reckoning,
the granaries and wine cellars of Teishebaini were intended to store products obtained from an area between 4,000 and 5,000 hectares. Cuneiform records show that the staff of the royal estate at Rusakhinili was about 5,500 people.”

The above record of irrigation works attributable to Urartian kings in the period ca. 810–645 BC does not itself prove which factor was uppermost in stimulating this activity: growth in population, decline in rainfall, or the political ambitions of successive Urartian kings. Significantly, Zimansky repeated (1985) what Burney and Lang (1971) had observed: “Supply and storage of water, presumably mainly for irrigation, was a constant concern of successive Urartian kings. At the present time climatic conditions in the Urartian homeland are such as to make it difficult to understand the necessity for such elaborate engineering works: either a lower annual precipitation or a very large population must be postulated.”

Sherratt (1988) interprets the intricately engineered Urartian irrigation works as “part of the general pattern of intensified inputs of capital and labor and more elaborate construction typical of all forms of irrigation from the 1st millennium BC onwards. Intensive irrigation led in many areas to substantially higher population densities and an extension of the areas under state control. Many of the features stressed by Wittfogel (1957) as associated with irrigation agriculture may thus be more characteristic of these Iron Age developments than of preceding systems, which were often village-based and local in management.”

It appears that the ecology of the region of Urartu was of crucial importance throughout its existence. Geology Professor Emeritus Richard Cowen of the University of California–Davis stressed clearly (1999): “Mesopotamian engineers built very large weirs and diversion dams, to create reservoirs and to supply canals that carried water considerable distances across the flat countryside. The scale of their irrigation was larger than in Egypt, and Mesopotamian irrigation was interventionist and active. Almost certainly, the idea of diversion dams was brought to Mesopotamia from the hills, since the rivers are mostly perennial. Mesopotamian tradition suggests so: Sargon of Assyria probably learned it from the ancient nation of Urartu. The scale and ambition of early Iron Age Mesopotamian projects was matched only in China and Egypt.”

URARTIAN INNOVATION II: INTRODUCED SUMMER CROPS
SESAME AND MILLET EXPANDED GROWING SEASON

Hydraulic control assists ecological flexibility. Irrigation enhanced and diversified strategies such as extending growing seasons. As Horden and Purcell (2000) note: “Hydraulic works can be very labor and capital-intensive, and self-consciously showy. No doubt, therefore, about the link here with intensification of production: the investment in higher status, higher value crops.”

Agriculture was the foundation of the Urartian economy. Along with the winter cultivation of native wheats, barley, chickpea, flax, grapes, fava bean, lentils, rye, and vetch, exotic crops tolerant of drought and high temperatures were introduced as summer crops, an adaptation to the physical environment, “buffering risk through diversification” (Fuller 2005). Among these new cereals were small-seeded millets and rare occurrences of foxtail millet (Nesbitt and Summers 1988), sown in the spring and harvested in late summer. Another summer crop that became more common in the Iron Age is the oilseed sesame, found occasionally in the Near East from the Early Bronze Age onwards (Bedigian 1984, 1985, 1998, 2000, 2004; Bedigian and Harlan 1986; Samuel 2001). Sesame and millet, integrated into the agricultural calendar by intercropping or by using the same land subsequently for a second or third crop during the season (Horden and Purcell 2000), expanded the economic potential of the region.

The reasons for defining sesame as a summer crop have been previously described (Bedigian 1984, 1985; Bedigian and Harlan 1986). A singular text (Reiner 1995), a letter from the Old Babylonian period, is an instruction to farmers based on astronomical data. It warns not to soak sesame seeds in preparation for sowing before the rising of Sirius. The letter, TLB 4 (= Altbabylonische Briefe,
3 [Leiden: Brill 1968]) no. 65, is quoted by F.R. Kraus (JAOS 88 (1968)) and again, with an added reference to stars signaling the time to cultivate, by R. Frankena (SLB 4). Pliny and Columella also recommended spring sowing. Semple’s review “Ancient Mediterranean Agriculture” (1928) also referenced Theophrastus and Pliny, indicating: “Sesame, like millet and panic, was a summer crop in both Greece and Italy and all three throve best by irrigation.”

Substantial scholarship regards sesame and millet cultivation as a Iron Age agricultural innovation. Watson (1983) specifies: “The introduction of such summer crops on a wide scale radically altered the rhythm of the agricultural year as land and labor which had previously lain idle, were made productive.” Nesbitt (2002) indicates: “We have enough data to hint at major changes in agrarian practice: the introduction of summer season crops such as millets in the Iron Age.” Riehl and Nesbitt’s survey (2003) detected that, generally, flax appears less common at Late Bronze Age and Iron Age sites than in earlier prehistory, suggesting its increasing substitution by olive and sesame oils.

In this mountainous area, the urban centers such as the Citadel of Van were dispersed hilltop fortresses (Smith 2005), enclosing palaces and temples, from which to watch and protect the trade routes and the surrounding farms. Historical references and archaeological evidence indicate the considerable artistic and technical skill of the Urartian people. The authority of the rulers rested mainly on their ability to control supplies of agricultural products extracted from their territories. Cuneiform inscriptions documented various agricultural activities of the kingdom (Burney 1972; Lehmann-Haupt 1926). Several texts indicate that they planted vineyards and made wine. An inscription from the time of the Urartian king Išpuini (830–810 BC) on a rock face found at Zivistan (Elmali) village, located some 18 km south of Tuşpa, records that the son of Sarduri I, Išpuini, built a vineyard and an orchard in the area. Iron Age terraces are still detectable in the vicinity of the rock face. Rock inscriptions say that vineyards were built in the name of the god Haldi for good yields, and wine libations were offered to the gods. An inscribed rock in the Bendimahi Plain northeast of Lake Van records the planting of a vineyard for King Menua. Rows of storage jars bearing Urartian hieroglyphics at excavated Urartian sites attest to warehoused crop surpluses, oil, and wine.

Zimansky (1985) notes: “There is a general consensus among students of Urartu that storage of foodstuffs, particularly grain and wine, was an important concern of the state … This is hardly surprising in a land where the winters are prolonged and the military apparatus of the state was geared to the defense of large citadels that had to be capable of withstanding long sieges. Two kinds of storehouses are mentioned in Urartian texts … and their contents are given respectively in terms of liquid and dry measure … the former may credibly be associated with the large pithos rooms that are so prominent at Urartian sites. Cuneiform notations frequently inscribed on the shoulders of these pithoi give the volume in aqarqi and terusi, used elsewhere as measures of wine and oil. Yet, numerous and impressive as these pithos storerooms are, there is surprisingly little inscripntional evidence for their existence.”

**IMPACT OF SESAME: URARTIAN SESAME MILLING WORKSHOP AT FORTRESS TEISHEBAIN1 (KARMIR BLUR)**

Chahin (2001) extols Teishebaini (Karmir Blur; 40.15° N, 44.45° E) for the high productivity of its land as being “enhanced by the extensive network of canals for the irrigation of the land, the introduction of improved seeds and the application of iron tool implements; for example the use of an iron ploughshare, instead of the original wooden one, which could dig deep into the soil. A large variety of iron weapons and tools have been excavated at Karmir Blur.” Piotrovskii (1950a, 1950b, 1967, 1969) initiated what was to become the largest and longest-lived excavation project ever conducted in southern Caucasus, after an Urartian cuneiform inscription was uncovered at the site of Karmir Blur in 1936. Smith (2005) regards it today as the most extensive systematic excavation of an Urartian site.

In this high and dry landscape, an Urartian workshop for pressing sesame into oil provided a substantial industry (Barnett 1959; Kassabian 1957). Perkins (1950) summarized news of Piotrovskii’s
finds jubilantly: “In one of the largest rooms, sesame oil cakes and residuum of sesame butter were found on the floor. In an adjoining room stood a tub of calcareous tufa with a stone trough for draining off waste liquid, this probably served to soak the sesame seed. Nearby was a large stone mortar with a huge pestle for husking the seed. The quantity of sesame oil cakes and the necessary utensils for making sesame oil attest to the large-scale economy of this Urartian administrative center. The other groups of excavated rooms were storerooms in which were grain supplies and metal objects. The floor of one was covered with about 20,000 liters of millet, and in one corner on the wooden flooring lay a group of bronze phials of Assyrian type, a pail with two sculptured bulls’ heads, bracelets, belts, and other objects. In one of the vessels was a small gold earring of fine workmanship … The objects discovered indicate extensive trade relationships of the Van kingdom with other countries of the Near East.”

Perkins (1950) further reported: “In the excavation of these buildings a large number of vessels filled with well preserved grains of barley (Hordeum vulgare L.), wheat (Triticum vulgare Vill.) [a synonym of T. aestivum L.], millet (Setaria italica), and other grains were discovered near the hearths, and large supplies of grain were also preserved in holes dug in the floors. Besides these were sesame (Sesamum orientale L.), chick-peas (Cicer arietinum), small beans (Vicia faba), lentils (Ervum lens), and a type of grape (‘Voskekhat’) widespread in modern times. The agricultural development revealed here coincides strikingly with that of the Assyrians. Near the hearths of the buildings were found stone grain pounders, a mortar and pestle, iron tools and weapons, and often in the corners heaps of small beads, cowrie shells, bronze ornaments and belt fragments.” ‘Voskekhat’ is a unique indigenous golden grape cultivar, much used in today’s Armenia and environs, for making champagne, cognac, and wine.

Barnett and Watson (1952) described vast arrays of large storage rooms used to keep tribute and supplies. The building as a whole covered 1,600 square meters and contained at least 120 rooms; 30 have been excavated: “The walls are of large unbaked bricks containing chopped straw. The bases of the walls consist of huge unworked stones. Some of the walls are up to a height of 7 m, about 4 m wide. The original height of the rooms is believed to have been about 10 m. The roof was flat and was made of beams of pine, poplar, oak and beech. Room 4 contained a vat with a gutter leading out of the citadel.”

Recent assessment by Smith (1999) reports: “130 discrete rooms of the ground floor, as well as the doorways that connected them, have been mapped … The range of activities carried out on the ground floor was generally limited to the storage of wine, grain, dishes, and utensils, and the production of beer, sesame oil, and bone and metal objects.” Grain remains included wheat, barley, rye and millet, and two kinds of beans, chickpea, and lentil. Quoting Barnett and Watson (1952): “Room 2 contained cakes of sesame and refuse of sesame oil, apparently used for fuel or fodder, stone rubbers and a pestle and mortar.” Room 7 contained remains of six pithoi holding sesame seed (Figures 23.2 and 23.3).

Barnett and Watson (1952) continue: “Room 25, the roof of which was supported on three columns painted with frescoes in several colours representing a sacred tree between winged figures surmounted by a (winged?) disc, was a wine-store. It contained 82 pithoi half buried in the ground. All are marked with measures of capacity, 62 being in hieroglyphs, 20 in cuneiform, and were evidently meant for wine … Of these, a few were filled with wheat, barley and sesame. One, however, contained 97 bronze cups, all inscribed variously with the names of Menua, Argishti, Rusa and Sarduri. The inscriptions on Menua’s six cups state that they belong to his fortress. 83 are inscribed ‘belonging to Sarduri,’ and five out of six belonging to Rusa, also claim to belong to ‘the fortress’ and bear a tree, a turret and a lion’s head.” Other plant remains include a vase found in a house near the west facade with seeds of Camelina microcarpa Andr. ex DC, some fragments of Trans-Caucasian thyme, and sesame seeds in four large vases in Room 1 of the palace; a plum pit was found Room 14, and remains of pomegranate seeds in a house near the northwest corner of the fortress.

Indicative of the Urartian kingdom’s cosmopolitan nature and trade relations, the excavators mention that beads of carnelian, sardonyx, rock crystal, and steatite were found in huge quantities,
FIGURE 23.2 Pithoi containing sesame seed, excavated at Karmir Blur, mid-20th century.

FIGURE 23.3 Excavators at Karmir Blur, Zohrab Kassabian and associates, mid-20th century.
History of Sesame Cultivation and Irrigation in the Armenian Highlands

and that the carnelian spherical beads have a funnel-shaped perforation that shows them to be Assyrian, whereas three barrel-shaped beads of golden carnelian are bored with a diamond, giving a strictly cylindrical perforation. An article referenced without citation (Barnett and Watson 1952) suggests that they are from Iran or India. A box of birch bark found in the western part of the palace contained a necklace of agate beads, three Urartian seals, and a bronze pendant bearing an inscription in cuneiform. Scaraboids of Egyptian type and a small pendant of glazed paste representing Sekhmet show connections with Phoenician or Egyptian circles. In Mongait’s view (1959): “Data obtained in the Teishebaini site give an idea of the broad intercourse the people of this town had with neighboring countries. The finds in the palace include Assyrian seals and beads, amulets with Egyptian hieroglyphics, and gold ear-rings from the Mediterranean.”

Barnett (1959) observed: “The Urartians seem in building Teishebaini to have used the type of terrace usual in the ancient Near East to incorporate their household quarters and storerooms—a three-room workshop for extracting sesame oil, six storerooms …” Barnett (1959), praising “the only scientifically controlled excavation” of the region, reported “ornaments which included twelve large sard beads; about fifteen beads of grey glazed faience, others much damaged, of glass and sardonyx, a lignite tubular bead, another of faience, and a necklet, consisting of sixty-two cowrie shells,” this clearly indicative of long-distance trade. In Piotrovsky’s (1970) judgment, “Stone, coloured paste and glass beads form a large and most interesting group of objects. They are found in a great variety of shapes and a study of them points to the existence of extensive connections between the Urartian towns and other countries and regions of the ancient world, such as Iran, Asia Minor, the Mediterranean, and Egypt. The objects of material culture and art found during the excavations on the Karmir-Blur site, shows that Urartian craftsmanship reached a high technical level. It also reveals the existence of wide commercial and cultural contacts of Urartu with other countries of the Ancient Orient, and with Scythia.” Van Loon (1977) reveals details of Urartu’s trade in exquisite luxury goods during the first millennium BC.

For a century, the wealth and political power of Urartu influenced the cultural development of the eastern Mediterranean countries. Urartian bronze artifacts dispersed throughout the ancient Near East include hundreds of ceremonial cauldrons in Delphi and Etruria (Issar and Zohar 2004). Lang (1970) lists choice Egyptian scarabs and amulets with hieroglyphics, Assyrian seal cylinders and beads, gold and pearl earrings, and a silver jug from Phoenicia recovered at Karmir Blur to show that Urartu’s commercial links extended to the banks of the Nile. Curtin (1984) observed: “The Armenian kingdom of Urartu was an important stopping point for trade between Asia and the Mediterranean world … Fragments of Chinese silk dated to 750 BC indicate that this region must have been one of the earliest to receive goods from China.” Thus, the impact of Urartu has endured for centuries after its collapse.

SESAME’S ECONOMIC BOON

Records of specific Urartian transactions are unpublished, but perhaps this economic comparison of sesame prices during the Assyrian Bronze–Iron Age periods, in Kennett’s (1975) view, is analogous. During Sargon’s reign (2270–2215 BC), the price of sesame oil was kept artificially at the same level as grain, because both were equally essential to people. But by the reign of Assurbanipal (668–626 BC), sesame cost nearly four times as much as grain, because demand was so great. Pomades for careful barbering, perfumes, unguents, fumigants, and even soap, with various fragrances, were common among all classes.

The prosperity of Ararat was through crop cultivation. Chahin (1987) observed: “Other countries paid tribute to Urartu in the form of cattle and sheep, never in cereals … This supports the view that they had such an abundance of grain in their own country that it was not worth burdening themselves with additional stocks of cereals. It was much easier to drive livestock to their homelands. They never write of destroying harvests or plantations.” When Sargon invaded Urartu in 714 BC, he found great stocks of grain everywhere. In the frontier province of Uisdis and in every major

center, there were, according to his scribes, many capacious storage magazines, each containing large quantities of grain (Piotrovskii 1969). Sasson (1966) shows that Babylonia depended on its neighbor to the north for imports of an ever-increasing number of materials, especially since trade with Dilmun, Magan, and Meluha was curtailed sharply after the collapse of the southern cities. These articles included large quantities of sesame oil.

Scythians captured Teishebaini at the beginning of the 6th century BC. Mongait (1959) wrote: “B.B. Piotrovsky who headed the excavations reconstructed the circumstances of the fortress’ fall in minute detail (Piotrovsky 1988). Obviously abandoned at a moment’s notice judging by the food reserves in the temporary dwellings of the besieged (the grain pits and small vessels are full of grain), the siege of Teishebaini was short. The Scythians launched a sudden night attack in the first half of August, took the citadel by storm and destroyed it … The finds in these dwellings helped to elucidate the time of the year. Grain had been harvested, but the vine had not yet ripened. A tuft of grass that was preserved contained flowers that bloom at the close of July and the first half of August. During the assault, the Scythians set fire to the citadel as well; the wooden floors and ceilings burned like matchwood.”

Scholars have suggested various groups as being responsible for Urartu’s demise. Among them are the Cimmerians from the northern Armenian Plateau, who in the early to mid-7th century seem to have controlled the central Zagros and may have annihilated Urartu on the way; the Medes and Scythians are suggested, too, but there is no solid evidence. The end of Urartu was violent, however, as many of its fortresses were burned down. “Certainly, by the late 6th c, Urartians had been replaced by Armenians” (Van De Mieroop 2004). I await eagerly the additions that Burney (1957) promoted: “This survey of Urartian sites is not, of course, complete: other sites must exist in the lands around Lake Van. There are still the provinces of Erzurum, Karaköse, Kars and Hakkâri, in Turkey, and the Urmia region, in north-western Iran, awaiting exploration.”

KNOWLEDGE OF HARVEST METHODS AIDED IDENTIFICATION OF ASSYRIAN šamaššammû

A claim put forth by some who attended the Sumerian Agriculture Group’s 1984 meeting, which focused on scholarship for distinguishing Assyrian sesame from flax, argued against identifying sesame as the oilseed in the passages, based on an ancient text that described the harvesting of šamaššammû by uprooting the entire plant. Some participants reasoned that only flax is harvested in that way. However, field observations (Bedigian 1998; Rabo 1980) in Syrian villages along the Euphrates in former Mesopotamia reveal that, there, sesame is harvested by pulling. Scrutiny of the previous year’s dried sesame stalks saved for kindling and conversations revealed that more than 85% of the villagers in that region harvest sesame by uprooting the entire plant. There is a practical reason for this. Firewood is scarce in the region, and those stalks fuel the bread ovens.

This practice was also common in Turkish Armenia before 1914 (Bedoyan 1972; Halajyan 1973). An early account from Syria, Lebanon, and Palestine (Cuinet 1896) states that harvested plants were pulled up and shocked or stacked, and when ripe, inverted so the seed fell out. Teishebaini excavator Zohrab Kassabian (pers. comm. 2001) interviewed a number of sesame growers in Armenia in 1957, who indicated that they harvested their plants by uprooting. Note that the practice of uprooting is not widespread globally. The more usual practice is to cut the stems with a knife or sickle and gather them into bundles (stooks), which are stood upright in the field until they are dry (Bedigian and Harlan 1983).

HINTS FROM LANGUAGE: SESAME NAMES REVEAL DISTINCT SOURCES

Two distinct Armenian names for sesame suggest disparate sources: Semitic shushmah, susam, from Mesopotamian šamaššammû (Bedigian 1985; Bedigian and Harlan 1986), and konjed, from Persian and Sanskrit (Bedigian 2004). This is not surprising, considering the location of Armenia.
on the Silk Route, at a crossroads with Central Asia and Persia, as well as Mesopotamia. “Since Ararat was situated astride the commercial highways between East and West and between the north-south routes at its extremities, it was bound to receive information about social and economic changes and innovations and, in particular, on new modes of husbandry, throughout the ancient world” (Chahin 1987).

Persian linguist Nicholas Sims-Williams (pers. comm. 2009) summarized what is known of the etymology of konjed: “Cognates of Persian konjed are widely attested in Iranian languages beginning in Middle Iranian times (Middle Persian kunjīd, Khotanese kunjīsata), but its ultimate origin does not seem to be known. H.W. Bailey, Dictionary of Khotan Saka, Cambridge 1979, compares Sanskrit kuñcita-, but according to the Sanskrit dictionary this word means ‘crooked, bent, curled’: it is said to be used as a name of Tabernaemontana coronaria, but not of sesame.” Bedigian (2004) proposed that the source derived from classical Armenian.

LEGACY: ENSUING ARMENIAN TRADITION

Mongait (1959) points out: “Archaeological evidence relating to the history of Armenia from the 6th c BC to the 1st c A.D. is very scarce not because there are few monuments of the epoch but because these monuments have hardly been studied at all. Archaeologists have done nothing to investigate the period of the struggle of the Armenians against Iranian conquerors or the rise and history of the first Armenian kingdoms. A united kingdom took shape in Armenia already in the 2nd c BC and attained its greatest power in the 1st c BC. In that period, Armenia had more than 15 flourishing cities that were famous for their palaces, temples and other buildings.”

Xenophon wrote about the cultivation of sesame in ancient Armenia in the 5th century BC in Anabasis (IV.iv.13): “In (western Armenia) . . . there was a scented unguent in abundance that they used instead of olive oil, made from pork fat, sesame seed, bitter almond and turpentine. There was a sweet oil also to be found, made of the same ingredients.” Xenophon situated sesame in two other parts of Asia Minor. One was Cilicia: “This plain produces sesame plentifully, also panic and millet and barley and wheat” (I.i.22). The other was “Calpe Haven in Asiatic Thrace,” farther west. “Calpe lies exactly midway between Byzantium and Heracleia,” has “good loamy soil . . . produces barley and wheat, pulses of all sorts, millet and sesame, figs in ample supply, numerous vines . . . indeed everything else except olives.”

IMPETUS FOR ARMENIAN SESAME CULTIVATION: RELIGIOUS FASTS REQUIRE ABSTINENCE FROM ANIMAL PRODUCTS

One appeal of sesame cultivation to the Armenian population was that it enabled adherence to the church mandates of austere fasts, which require abstinence from all flesh products: meat, fish, eggs, and dairy products. An early modern traveler to the Orient, Sir Thomas Herbert (1638) took note of the Armenian custom of strict Lent observance. Abstaining from flesh, fish, eggs, butter, they substituted “oyle, bread, honey, water, dates, cowcumbers, melons, herbs and the like.”

Two centuries later, the Russo-German professor Friedrich Parrot (1845), the first explorer in modern times to reach the summit of Ararat, described field crops at the Araxes Valley north of the Araxes River to include cotton, castor, melons, pumpkins, watermelons, tobacco, wheat, and barley in the “wide and level basin of the Araxes in which Etchmiadzin is situated … The plant, however, which is of the greatest importance to Armenians, on account of their fasts, is the kunjut (= konjed), from the diminutive seeds of which well-flavoured oil is prepared, and used as a substitute for butter.”

At the close of the 19th century, traveler Müller-Simonis (1892) also regarded the Araxes-Ararat Valley as a very fertile oasis where in the month of August, peasant farmers cultivated rice, sesame, Ricinus for oil, cotton, and grape. He also reported that Alaschert was renowned for sesame, walnut, and flax.
OIL INDUSTRY AT ANI, AN ARMEINIAN CAPITAL, CA. AD 1000 AND ITS INFLUENCE

Ani, today a ghost town located on a windswept plain on the edge of the Armenian Plateau, was in the 10th century an important crossroads for commercial caravans, controlling trade routes between Byzantium, Persia, Syria, and central Asia. Its location, along the winding canyon of the deep Akhourian River gorge, was strategically defensive. Merchants and craftsmen flocked to Ani from Armenia’s older cities, accompanied by a flow of population from rural areas of Armenia. In 885, Ashot Bagratuni founded the Bagratid Kingdom of Armenia, also called the Kingdom of Ani or Shirak. In 961, Ani was proclaimed the capital of Armenia. By 992, the Armenian Katholikos had moved its seat to Ani; at the start of the 11th century there were 12 bishops, 40 monks, and 500 priests in the city. By mid-11th century, the population of Ani was well over 100,000, some suggest as high as 200,000; Ani became renowned as “the city of a thousand and one churches.”

Hewsen (2001) reports that the kingdom of Greater Armenia reached its apogee in the reign of King Gagik I (989–1020), when Ani was the flourishing capital city of Armenia, surpassed in importance only by Cairo and Baghdad. The few buildings left today, their walls patterned in red and black stone, indicate that the city must have been grand. Ani had immense, fortified walls built using beautiful masonry, a citadel, a caravansaray, a cathedral and numerous churches, street lighting, drains, and an underground fresh-water supply. The Bagratids built magnificent churches and monasteries at Ani, putting to use the taxes reaped from a rich export of textiles, metalwork, armor, jewelry, horses, cattle, salt, grain, wine, honey, timber, leather, and furs. Agriculture played a vital role during the Bagratid period. Grain, cotton, rice, and grapes were the main products of the country. Curtin (1984) wrote that Armenia became comparatively powerful and prosperous, and even extended to the Mediterranean.

Kamsarakan (2001) deems: “An active sesame seed crushing industry existed in Ani, where an oil mill has been excavated.” Sheil (1856) includes end notes containing observations of the British ambassador to Persia regarding his travel in 1840 from Erzurum to Ani: “The reputation of the grandeur of this extinct city [Ani] still survives; our guide said it contained 1000 churches, and a similar number of lamp-oil manufacturers.” French orientalist Brosset, who specialized in Armenian studies, enumerated four commemorative inscriptions at Ani, dedications of individual oil mills (Brosset 1860): “Lui fait présent d’un Moulin à huile, acheté à ses frais,” (“He makes a present of an oil mill, bought with its expenses”) and “un Moulin à huile, bati pour le profit du convent par un homme pieux, un certain Khouthlou, en 783,” (“An oil mill, built for the profit of the convent by a pious man, a certain Khouthlou, in 783.”)

There was such abundance of sesame in Armenian lands (Bedigian 2004) that 12th-century Greeks disputed with the Armenian clergy over deviation from Church regulations in substituting sesame for olive oil, which was scarce in the region, in the preparation of the holy Miwron, used in ritual anointing. Armenian medical formulations (Bedigian 2004), including A Compendium of Medical Consolations from the 12th century, and Amirdovlat, the complete prescriptions of a 16th-century Armenian physician to Suleiman the Magnificent, attest to its ubiquity.

Tenth-century Arab geographer Ibn Hawqal related (Horden and Purcell 2000) how al-Hasan ibn Abd-Allah ibn Hamadan took control of Nisibis (present Nusaybin), southeastern Asia Minor, during the conflicts between Byzantium and the Arabs of the era: “He felled the fruit trees and remodeled the watercourses, amassing by confiscation and by purchase vast tracts of the property of those who had fled to the infidel. Very few proprietors were left. In place of arboriculture he introduced cotton and rice and grew cereals and sesame alongside. When the revenues doubled, he could colonize uncultivated land, letting it to the deserving, who became share-croppers owing him half the crop. The populace accepted his rule and that of his son, but was soon reduced to misery by the rapacity of Ibn Ra’i, who took to estimating values in a way that left the cultivator nothing, and who hoarded all the surpluses in his own stores.” As an instance of the successful and imaginative
introduction of new crops, this tale from upper Mesopotamia could be viewed a demonstration of the
improving zeal of the landlord at its best (Watson 1983).

Faroqui (1990) reports that if the evidence of the administrative system is at all reliable, Asia
Minor had areas during the years 1570 to 1580 in which the population density increased and agri-
culture probably became more intensive. Citing Mustafa Soysal’s work on the Yüregir plain, semi-
nomads cultivated not only grain but also cotton and sesame in their winter quarters.

Evliya Çelebi, on a journey through the Pamphylian Plain in 1671–72 (Crane 1993), observed:
“Among Alâiyye’s praiseworthy products, its sesame is well known and its thin, unleavened breads
and rolled bread are famed.”

SESAME CULTIVATION AT THE CLOSE OF THE OTTOMAN PERIOD

Hamilton (1842: 374) portrayed “the road to Allah Sheher along a rich and well-cultivated plain five
or six miles in width, bearing heavy crops of wheat, Indian corn, sesamé, millet, melons &c., and
near the foot of a range of heights consisting of detritus from the schistose hills, picturesquely worn
away and wooded. These low and advanced hills are a portion of the range on which the Acropolis
of Sardis stands, and they extend the whole way to Cassaba.” Langlois (1861: 319) described Cilicia
as ‘Little Armenia’: “The principal products of the field are cotton, the average annual value of
which is $600,000; wheat, of about equal value; sesame, in value about $75,000, of which a great
deal of oil is made; barley, in value about $60,000; about $14,000 worth of wool; and about $8,000
worth of tobacco, very far inferior to that of the Lebanon.”

Writing about the first decade of the 20th century, Woods (1911) remarked on coastal central
Asia Minor: “The rich lands of the Cilician Plain are cultivated for cotton, wheat, barley and ses-
amé, which are exported from Mersina—a modern seaboard town.” However, circumstances at the
mile-high (1750 m) city of Van were radically different, as Woods reported, his eyewitness of the
destruction of Armenian crops (1911): “Owing also to the season of the year, fields of wheat, cotton,
barley, oats, and sesame which belonged to Christians were either entirely destroyed, or gathered in
by Moslems, who sometimes, if more than usually charitable, gave a small proportion of the crop
to its Christian owner.” Historian Adam Smith (2005) summed up: “The expansion of World War
I beyond Europe to incorporate a contest in the South Caucasus between Russia and the Ottoman
Empire brought with it the unfathomable horrors of the Armenian Genocide.”

What remains of sesame cultivation after those gruesome events? Mason’s reconnaissance (1919)
recommended: “Timber grown here would be worth its weight almost in gold in Mesopotamia. The
villages Shakhlawa, Hiran, Nazanin, already have extensive poplar plantations. Dwarf and scrub
oak abound throughout the country, and oaks 30 feet and more high are to be seen in places. The
chinar, or oriental plane, is also common in some valleys, and mulberries and walnuts are cultivated
in the villages. Cereals include wheat, barley, peas, cotton and sesame, while vineyards are situated
near many of the villages. All these have suffered very much during the war.”

Merriam (1926) described the system extant on the Cilician Plain as “three-field rotation”: “Grain
is grown the first year. In the second year, cotton is planted either alone or with sesame, or sesame
is planted alone. In the third year, the field lies fallow, though in placespastured. Cotton is sown in
March or April and harvested in October. In the case of mixed crops, the sesame ripens one month
earlier than the cotton. Because the sesame seeds draw so much nutrient material from the soil that
the amount and quality of the cotton fiber is much reduced, mixed cultivation is gradually being
given up.” Semple (1921) portrayed only the Marmara coastlands on the Aegean: “Agricultural
products in great variety—grains, olive oil, wines, linseed, flax, cotton, opium, sesame, and mul-
berry trees for sericulture—are raised along the seaward slopes.” A generation later, Seton Williams
(1954: 128) observed: “The lower stretches of both the Seyhan and the Ceyhan are a mass of shal-
lows and sandbanks. Even cotton ceases to grow near the coast and the only crop that seems to
thrive is sesame.”
Sesame: The Genus Sesamum

A sesame specimen at the Herbarium, Naturhistorisches Museum, Vienna (http://herbarium.univie.ac.at/database/detail.php?ID=138603), collected by entomologist Dr. Franz Tölg (s.n.), “Kurd Jula (Armenia) April 24, 1914,” has black, somewhat rugose seeds. Parenthetically, the specimen date does not follow usual botanical practice indicating a collection date. Since Dr. Tölg was an entomologist, it is possible the writer indicated an accession date instead, or it was simply a slip in the chaos of World War I.

Up to 1915, the year that Christian minorities in the Ottoman Empire were imperiled, Julamerik was the heartland of the Nestorian Christians and home to a mixed population of Armenians, Assyrians, Chaldean Christians, Jews, Kurds, and Yezidis. The town Julamerik, a name with multiple published spellings—Julámerik, Júlámerik, Julamerg, Djoulamerg, Dshulamerik, Colemerik, Çölemerik, Gûlarmak, Tschoulamer, Hakkâri—is the capital of Asia Minor’s extreme southeastern Hakkâri province, situated in a valley gorge surrounded by steep mountains. At 1,720 m elevation, on a sloping alpine valley high above the mighty Zab River, facing the formidable 3,467 m Sümübül Dağ (Hyacinth Peak), it has attracted notice from various early travelers. Hoskyn (1842) noted: “It is situated in a deep hollow, on the Kurdistan upland, being an elevation of about 5400 ft, and in a ravine, by which the rivulets of the district—of which there are many—find their way into the Zab, flowing immediately below.” Kinzer (2010: 32) illustrates Çölemerik “in the breathtakingly rugged Turkish province of Hakkari in the Kurdish heartland” with a colorful photo essay.

Peter Davis, editor-in-chief of the definitive 11-volume *Flora of Turkey*, described the setting (1956a), recounting his adventurous plant-collecting expedition to Çölemerik: “From Van we were to set off on a journey which I had dreamt of for years: to the province of Hakkâri in the remote south-east corner of Turkish Kurdistan. Our permits being in order, we drove off in much excitement towards this Shangrila where we had every hope of finding a rich, almost unexplored flora, in magnificent surroundings. As we drove south-eastwards from Van, the landscape became more desert-like and took on the unearthly reddish tones of a Salvador Dali landscape. We passed the castle of Hoşap, once a stronghold of rebel Kurds, standing immensely impressive and almost Scottish baronial on an isolated rock. A long line of camels crossed the beautiful sixteenth century bridge, banded in black and white stone like a Florentine building. The road began to rise, zigzagging up the metamorphic flank of Kepir Dağ, then down towards the village of Başkale. From Başkale we drove on southwards, entering the upper part of the Zab gorge. A lorry driver coming up from Çölemerik (our destination) warned us of smugglers and bears, but we spent a quiet enough night beside the rushing torrent. The road to Çölemerik has a reputation for extremely dangerous bends and a boulder-strewn surface; and indeed we did see the skeleton of more than one lorry upside down in the river that swirled hundreds of feet below us. But the surface of the road is now greatly improved, and lorries rumble along it nearly every day during the summer, bringing supplies to Çölemerik; the village is cut off by snow for five months of the year. As one descends the gorge of the Zab—the largest tributary of the Tigris—the scenery becomes increasingly savage. The river seems to follow a fault in the rock, for the cliffs are often limestone on the east side of the gorge, and slate or schist on the west. The road passes through several tunnels, and at last emerges on to a sloping terraced shelf about 300 metres above the river. This is Çölemerik, the administrative centre of Hakkâri, a village widely scattered through fields and gardens, having no natural focus beyond the administrative one where the new Government buildings, built to standard pattern with a roof of corrugated metal, dwarf the rest of Çölemerik. Except for the ruins of a pleasant khan (relic of the days when the Kurds migrated to and from the plains of Iraq), the place has no attractive architecture. But, built as the village is on a lip of the Zab gorge, it does have a magnificent situation. The great precipice of Sümübül Dağ frowns down on Çölemerik; yet it is inaccessible across the gorge.”
Kitto (1850) described subsistence there in admiring detail: “Cheerful vales and long terraces on the sides of the mountain boast of the gum tragacanth plant, at the same time that they yield grain, and produce the vine, as well as other fruit trees. The forests, in addition to the ash and oriental plane, have the finest walnut trees in great abundance; and the oaks bear large gall-nuts of the very best quality. The honey, found in holes underground or in hives made of mud is remarkably fine, as well as very plentiful; and it produces a fragrant wax in such quantities that it forms a constant article of export, with the gall-nuts, yellow berries, goats’ hair &c. In addition to these, the valleys likewise grow silk, cotton, tobacco, hemp, pulse, wheat, barley, rice, Indian corn, flax, sumach, sesame and the castor-oil plant. Melons and pumpkins grow to an enormous size; and flowers of all kinds, particularly the gigantic rose, are abundant.”

The Right Honorable Sir Austen Henry Layard, archaeologist and cuneiformist, upon leaving the Yezidi district, entered mountains inhabited by a large Kurdish tribe of the Missouri Badinan branch, and observed (1850): “The spot was rich in natural beauties. The valley, shut in by lofty rocks, was well wooded with fruit trees—the mulberry, the peach, fig, walnut, olive and the pomegranate; beneath them sprang the vine, or were laid out plots of Indian corn, sesame and cotton.”

Mid-19th-century author Karl May (2002) described a Yezidi religious ceremony: “Lamps were used to light the holy village and the entire surrounding area during the evening of the feast. No ordinary oil, or even bitumen and naphtha would be used, for these were considered unclean. Only sesame oil is permitted.” At Keshaf on the Tigris, May observed (2002): “Vineyards surrounded the houses and next to these grew sesame, corn and cotton. Their picturesque, almost decorative appeal came from the blossoms of flowers and well-tended fig, walnut, pomegranate, peach cherry, mulberry and olive trees.”

Lady Ethel Stefana Drower’s (1941) memoirs on visiting the Yezidis of Hakkâri district preserve traditional sesame oil pressing and use in graphic detail: “It was a large house and the several families of married sons lived in the compound. Not only was it a patriarchal dwelling, but, as A. remarked, it was a village in itself, for the various activities of milling, soap-boiling, olive-pressing, baking, and so on, took place in various chambers either above or below ground. The sheep, goats and donkeys had their quarters beneath the ground level, and underground, too, were the tall earthenware bins, oblong in shape, with a decoration of clay ribbon round the tops. In these were stored wheat, lentils, beans, chopped straw, and grains of all kinds. Sharing the same subterranean chamber was a mill for grinding sesame, previously crushed in the open courtyard above by the daqqâqa, a heavy stone roller attached to a centre pin on a raised round platform. A long rod from the centre connected with a mule or donkey which trod round and round till the seed was ready. The sesame-mill below was simply two round pitted black millstones that looked as if they were made of lava. The mill is called variously râha, madâr or jeghârah. The sesame is roasted a little and becomes thick and oily. Mixed with honey or fruit syrup it is used like jam, scooped up on the thin bread.

“If sesame oil is required, they pour water upon the crushed seed to separate the heavy elements from the oil which floats to the surface. The residue (tilf) is sold, or used in a variety of dishes; for instance, it may be prepared with raisins as a sweetmeat.

“I asked how they made bread. ‘It is of wheaten flour,’ they said, ‘and unleavened. We add some salt and a little sesame flour.’ The dough is mixed and rolled out on a smooth round stone table, the fursha, standing upon three stone feet (karâsî). This stone table is about a foot and a half across. The wooden roller, not unlike our own domestic rolling-pin, is called the shôbak. When the dough has been rolled out thin, a long, thickish rod called the neshâbi completes the shaping. The dough is lifted carefully, for it is as thin as paper, and placed on a leather cushion, and with this, it is dexterously slapped against the oven-wall. The result is the local khubz or kâk; the Kurdish word is nân. It is white, wholesome to the taste, and can be easily folded. People wrap their meat in it to save their fingers from grease, and use it like a spoon or scoop as well.

“While thus prying into household secrets we had consumed numerous glasses of sweet tea, eaten some bread dipped into sesame, and smoked cigarettes with our hostess, also bestowed Evil
Eye beads and chocolates on the children. Now we went on our way, followed by cordial leave-takings and smiles.”

GENETICIST JACK R. HARLAN’S 1948 PLANT EXPLORATION IN ASIA MINOR

In the year 1948, the USDA assigned agronomist Jack R. Harlan to collect seeds of economic plants. He spent one year searching every vilayet (Harlan 1950a; 1950b). It is unknown whether any single accession was a field or a market sample, because neither Harlan’s notes nor the passport information the USDA provided with these samples distinguishes that. Although Harlan collected from both sources, conversations with Harlan indicate that insofar as possible, he collected fresh seed directly from farmers’ fields. The Ministry of Agriculture gene bank in Izmir maintains his assemblage, with a duplicate set held at the USDA. Bedigian received the USDA world sesame collection, and reported the study of morphological characters using numerical analyses in “Patterns of Morphological Variation in Sesame” (Bedigian et al. 1986), an analysis of 353 accessions of sesame germplasm from 20 countries.

The locations of Turkish sesame accessions collected by plant explorer Jack Harlan for the USDA in 1948 appear in Figure 23.4. Many sesame-growing sites appear in river valleys and along the coasts of Turkey. The locations along the Euphrates correspond with those observed by Bedigian in Syria. Our results showed a great overall diversity within Turkish and Indian materials. One group of Turkish cultivars was the earliest maturing of all accessions grown in Illinois (Bedigian 1984). It would seem that this trait would render these Turkish lines able to evade the problem of scarce moisture, and increase their fitness for hot, dry conditions. This unique Turkish morphological type is quite short (50 cm), pubescent, and highly branched, with ovate entire leaves and single, pubescent, bicarpellate capsules. A second Turkish type has a blue-green plant color, but pubescence is low; the leaves are mainly undivided. The bicarpellate capsules are dense along the stem, one per

![Figure 23.4](image-url)
node. The corolla has a bright yellow throat. Bedigian emphasizes, though, that she saw a natural diversity within the accessions from Turkey, reflected in the complete lack of homogeneity in the cluster pattern. She and Harlan were unable to detect associations between morphotypes and their zone of origin.

A reasonable question that one may ask is why Harlan, as thorough a collector as one could wish for, acquired hardly any collections of sesame in Eastern Anatolia, during the year 1948 that he spent in Turkey, when it is a known fact that sesame was cultivated so universally in the Armenian Highlands for three millennia. One answer may be that after 1915, the Christian population responsible for such cultivation was forcibly eliminated from the country, closing down sesame cultivation in the Armenian Highlands.

**SIGNIFICANCE OF THE RESEARCH**

Urartian Iron Age innovations, irrigation technology coupled with the introduction of summer crops including sesame, impacted the economy itself, population densities, technological adjustments, social patterns, and the environment. These extraordinary technological adjustments led to increased settlement sizes that proved to be a catalyst for much that followed. Widespread adoption of sesame, a summer crop, as a major source of food and its value-added export item, oil, would transform the lives of people throughout Southwest Asia and beyond.

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And to indigenous sesame cultivators: exploited, forgotten, ignored, neglected, rejected; persons of courage, stamina, and strength, who have inspired me so.

Si lazima kuzima taa ya mwenzio ili yako ionekane.
(It is not necessary to blow out the other person’s lantern to let yours shine.)

**Swahili Proverb**

When the power of love overcomes the love of power, the world will know peace.

**Jimi Hendrix**

*Dona nobis pacem.*
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