

Radish Oil: A Phenomenon in Roman Egypt

Radish oil (ράφανέλαιον/έλαιον ραφάνινον) makes an unusual appearance in the Egyptian papyri at the time of Roman occupation of Egypt and is cited in some 50 documents from the first to the eighth century. By way of contrast, the documents of the Ptolemaic period, particularly those of the third century, make mention of a variety of common vegetable oils (castor, sesame, olive, safflower) but not a single mention of radish oil.¹ The radish is a common vegetable but radish oil is, to say the least, uncommon in antiquity as it is in modernity.

What perhaps is even more extraordinary is the fact that radish oil does not appear in the literary sources with the exception of some medical writers. A check of the TLG (CD #E) for ραφανέλαι- produced no citations, while ελαι- ραφαν- and ραφαν- ελαι- only produced citations from several medical writers. The *LSJ* lists one literary reference for ραφανέλαιον, citing Dioscorides 1.37 "in lemmate." A more definitive citation in literature—and coming from Egypt—is found in Lampe's *Patristic Greek Lexicon* taken from the *Apophthegmata Patrum* (see below).

As to references to radish oil in Latin sources, there are none save two notes in Pliny's *N.H.* and a brief citation for the price of radish oil in Diocletian's edict of Prices. In discussing oils derived

¹ For the Ptolemaic period, see the monograph of D. Brent Sandy, *The Production and Use of Vegetable Oils in Ptolemaic Egypt*. *BASP* Suppl. 6 (Atlanta 1989). On p. 6, n. 24, Sandy states that one possible reference to radish exists in *PSI* V 537.15 as ραφανε[λαίου?]. This restoration is very doubtful since the line reads ραφάννου[ε χ γ]ογγυλίδας (see *BL* I, 401) and more likely refers to "radishes and turnips."

In a recent article, Roger S. Bagnall has shown that vegetable seed oil (λαχανόσπερμον) is sesame oil (σήσαμον) and that the former replaced the latter exactly when the Roman administration replaced the Ptolemaic; see *Cd'É* 75 (2000) 133-5.

from a variety of plants and trees in Book 15.7.30, Pliny mentions that a very large amount of oil is obtained in Egypt from radish seed. In Book 19.26.79, he is more expansive, stating:

In Egypt the radish is held in remarkable esteem because it produces oil, which they make from its seed. The people are fond of sowing radish seed if opportunity offers, because they make more profit from it than from corn and have a smaller duty to pay on it, and because no plant yields a larger supply of oil (Transl. H.H. Rackham, Loeb Classical Library).²

In Diocletian's Edict of Prices, the price of radish oil (*olei raphanini/ἐλαίου ῥαφανίνου*) is given as 8 denarii per Italic sextarius and is listed among items of food such as vinegar, fish sauce, salt, and honey.³

A glance at Sandy's quantitative analysis of the use of castor oil (κίκκι, κροτών) and sesame oil (σήσαμον) during the Ptolemaic period (Appendices D+E, pp. 101-12) shows a dramatic decline in their appearance during the Roman era: 9 papyri and 7 ostraca for castor oil; 4 papyri and 5 ostraca for sesame. This statistic is even more remarkable in view of the fact that the number of Roman documents far exceeds those of the Ptolemaic period, leading one to ex-

² Strabo *Geogr.* 17.35 makes no mention of radish seed or radish oil, but on olives and olive oil he makes this observation on his visit to the Arsinoite nome: "This nome is the most noteworthy of all in respect to its appearance, its fertility, and its material development, for it alone is planted with olive trees that are large and fully grown and bear fine fruit, and it also produces good olive oil if the olives are carefully gathered. But since they neglect this matter, although they make much oil, it has a bad smell (the rest of Egypt has no olive trees, except the gardens near Alexandria, which are sufficient for supplying olives, but furnish no oil) [trans. H.L. Jones, Loeb Classical Library, 1932].

³ S. Lauffer (ed.), *Diokletians Preisedikt* III.4 (Berlin 1971) 102-3. It should also be noted that the edict lists only two kinds of oil, olive and radish. There are three grades of olive oil (the best made from unripe olives, second quality, and ordinary) and only one of radish oil. In terms of comparative prices, the three grades of olive oil range per sextarius from 40, 24, and 12 denarii down to 8 denarii for radish oil. For contrasting prices in a papyrus document of radish oil (2 drachmas per κοτύλη) and ἔλαιον χρηστόν, "good olive oil" (4 drachmas per κοτύλη), see *BGU* I 14.4.20-1 (250 A.D.); cf. *P.Princ.* III 147, p. 63 (see below, note 8). Worthy of note also is the absence in the Edict of the popular oils of the Ptolemaic period, castor or sesame (but cf. Bagnall's article for sesame, above, n. 1).

pect that if castor and sesame oils continued to be used in any quantity, this fact would be reflected in the documentation of the Roman period.

How to account for this historical transformation from the use of castor and sesame oils to radish oil? I can offer no explanation other than taste and price. In terms of usage, radish oil, like that of the olive, could be used both for illumination and as food, whereas castor oil, for obvious reasons, was not suitable as a food and was primarily used for illumination. Sesame oil on the other hand could be used for both purposes, but apparently was not popular during Roman times. However, just as sesame oil seems to have been introduced as an alternative to olive oil in the Ptolemaic period, radish oil may have performed the same function during the Roman era.⁴

Evidence, other than the papyri, for the use of radish oil for illumination and as food is slim but convincing. In the tractate *Shabbath* (26a) of the *Talmud*, the rabbinical authorities' debate focused on which oils could be used for lighting the Sabbath lamp. When R. Tarfon said that the Sabbath lamp may be lighted with nothing but olive, R. Johanan b. Nuri (I-II A.D.) countered by saying (in the Soncino translation, p. 113),

What shall the Babylonians do, who have only sesame oil? And what shall the Medeans do, who have only nut oil? *And what shall the Alexandrians do, who have only radish oil?* And what shall the people of Cappadocia do, who have neither the one nor the other, save naphtha?

Of course, the rabbinic authority was thinking of the Jewish population of Alexandria but he is also knowledgeable concerning the availability of oils besides the olive for illumination in other regions of the Middle East.⁵

⁴ For castor oil and its use, see Sandy, *op.cit.* (above, n. 1) 35-42; for sesame, see *ibid.* 54-62.

⁵ It should be noted, however, that the rabbi's statement concerning Egypt is limited to Alexandria, and not as inclusive as that made for Babylonia and Persia. Note also the confirming observation of Strabo (above, n. 2) that the gardens of Alexandria have olive trees that furnish no oil for the city.

For the use of radish oil as a food, a citation in the *Apophthegmata Patrum* mentioned above (PG 75.145A) tells of an encounter of Benjamin, Presbyter of Kellia in Scete, with an old ascetic monk who

bid us to have something to eat. He gave us radish oil and we said to him 'Rather than this, give us a bit of useful (i.e., good, olive?) oil.' Upon hearing this, he crossed himself and said, 'if there is any other oil, I do not know it.'

(... ἐκράτησεν ἡμᾶς φαγεῖν. ἔβαλε δὲ ἡμῖν ραφανέλαιον. Καὶ λέγομεν αὐτῶ: 'Πάτερ, μᾶλλον μικρὸν χρήσιμον ἔλαιον βάλει ἡμῖν.' Ὁ δὲ ἀκούσας, ἐσφράγισεν ἑαυτὸν, λέγων: 'Εἰ ἐστὶν ἄλλο ἔλαιον ἐκτός, οὐκ οἶδα ἐγώ.')⁶

Turning to the papyri, radish oil runs the gamut of citations similar to that of other commodities regarding purchases, receipts, expenditures, leases, personal and official correspondence. One document, however, stands out above all others and bears on R. Johanan b. Nuri's statement concerning Alexandria's dependency on radish oil. *P.Mich.* XI 613, dates to 415 A.D., is a receipt of an official in the office of the *praeses* of the province of Arcadia, acknowledging that he has received 150 solidi from councilors of Alexandria, out of the account for provisioning the city (ἀλιμονικὸς λόγος), for the purchase of 9,000 xestai of radish oil at a rate of 60 xestai to the solidus. The 9,000 xestai, by the Alexandrian measure, were to be delivered to and made available at the harbor of the Arsinoite nome. Coming under the rubric of ἀλιμονικός, these 9,000 xestai, representing 125 metretes (close to 5,000 liters), were authorized as a food entitlement.⁷

P.Mich. 613 points us also to the region where radish oil must have been produced in quantity. The city in which the document

⁶ Cited without comment in *P.Ross.Georg.* II 41.54 n. and *P.Mich.* 613, p. 38, n. 4. This episode most likely made its way into the "Sayings of the Fathers" to illustrate the humility and abstinence of the eremitic monks,

⁷ It should also be noted that *P.Mich.* 613 is a rare case, if not the only one to date, of a vegetable oil being provided under Roman legislation for the *alimonia* of Egyptian cities. On this topic, see A.C. Johnson and L.C. West, *Byzantine Egypt: Economic Studies* (Princeton 1949) 249-54. For radish oil prices as evidence that the Michigan papyrus dates to earlier than the Oxyrhynchus price schedules discussed below, see the comments of John Rea in *P.Oxy.* LI 3628-36, introduction.

was drawn up was Heracleopolis (line 1), the capital of the province of Arcadia, and the port to which 9,000 xestai of radish oil were to be delivered was Arsinoe (l. 6), also in the province of Arcadia. The names of other cities in Arcadia crop up in fifth-century documents dealing with radish oil. Of particular interest are *P.Oxy.* LI 3628-33 (pp. 72-93), containing six schedules of prices per unit for eleven staple commodities (gold, silver, unworked silver, wheat, barley, lentils, chaff, wine, meat, salt, radish oil). Cynopolis, Oxyrhynchus, Arsinoe, and Aphroditopolis, all nomes within Arcadia, provide prices for radish oil of 75, 80, and 105 myriads of denarii per xestes.

The fifth-century documents not only inform us that radish oil was an item in the Egyptian diet along with grains, meat and salt, but also name some of the centers within the Fayum and neighboring nomes for its production. Further evidence for the production of radish oil from this region as early as the first century can be perceived in contracts for the leasing of oil-presses (ἐλαιουργεῖα) on which rent is paid in the form of radish oil. *P.Prag.* I 38, dated to 96 A.D., records the lease of an oil-press in the village of Heracleia in the Arsinoite nome, for which the lessor commits to pay a rental of 2 metretes of radish oil and other items now lost in the lacuna. *SB XVI* 12518, dated to 104/5 A.D., is a lease for a press from the village of Theadelphia in the Arsinoite nome with a yearly rental of 220 drachmas and a gift of a keramion of radish oil. *P.Amh.* II 93, from 181 A.D., also from the village of Heracleia of the Arsinoite nome, leases out a press for a rental of seven keramia of radish oil along with half a chous for the festival of Isis, a chous for the harvest festival, and an extra allowance of two choes. *P.Fay.* 95, dated to the second century A.D., is a lease of (two?) presses in the village of Dionysias, once again in the Arsinoite nome, which may have been used for the production of olive oil in addition to radish oil. The yearly rental for the presses included one metretes six choes of strained olive oil and one metretes six choes of radish oil as well as extra allowances among which were six choes of olive oil and six of radish at festival time (some items are probably missing). *P.Fay.* 96, from 143 A.D. (cf. *BL VI*, 37), is a receipt for the rent of oil-press that called for two and a half metretes of olive oil and a similar amount of radish oil. *P.Oxy.* LI 3639, dated to 412 A.D., is a lease of

a "complete oil factory" (ὀλόκληρον ἐλαιουργιῶ[ν]) for a rental of 120 xestai of radish oil and a similar number of artabas of clean (wheat?).⁸

There are three documents from the Oxyrhynchus archive that offer unusual insights concerning the place of radish oil in the domestic life of the nome's inhabitants. Two of them, *P.Oxy.* X 1275 and XXXIV 2721, both of the third century A.D., are contracts involving the employment of musicians, and a dancing girl in the case of 2721, to perform for a number of days (five and four, respectively) at a festival. In addition to payments of sums of money, the contracts also call for food and drink for the entertainers.

In *P.Oxy.* 1275 (III A.D.), the hiring committee was obligated to provide transportation, a daily rate of pay as well as (ll. 16-20): "40 double loaves of bread and 8 kotylai of radish oil, and, for the whole period of the engagement, one keramion of wine and one of vinegar." *P.Oxy.* 2721 (234 A.D.) calls for transportation and lodging and, like 1275, a daily pay in money and a supply of (ll. 14-7) "12 double loaves of bread, 2 kotylai of radish oil, apart from what goes into the lamp (χωρὶς χωροῦντ[ο]ς λαμπάδα), one segmented (?) bread, the usual service, and for the whole period of the engagement one keramion of wine ..." The two documents show clearly that radish oil, along with bread, was a staple dietary item.⁹ *P.Oxy.* 1275 demonstrates that the oil was also used for illumination.

The third Oxyrhynchus document illustrates further that the use of radish oil had a wider application than its use at festivals or

⁸ The large quantities of radish oil produced from seed would lead us to expect documentary evidence of transactions for ῥαφανόςπερμον. However, a check of the DDBDP (PHI #7) yielded only one document, *P.Princ.* III 147 (revised in *BASP* 5 [1968] 10-2), dated to 87/88 A.D., a lease of land which was to be sown with radish (l. 12: σπε<τ>ραι ῥαφάνω) at a rental of two artabas of radish seed per aroura (ll. 14-5: ἀγὰ ῥαφανο-| σπέρμου ἀρτάβας δύο). The likelihood is that radish seed was frequently cited under the general term of "vegetable seed" (λαχανόςπερμον) which is often mentioned in the papyri.

⁹ The radish oil that the desert ascetic (*Apophth. Patrum*, above) placed before the presbyter as a meal, was undoubtedly served with bread. In this writer's experience among the bedouins of Southern Palestine and Sinai, bread and olive oil were basic elements of their diet.

to express the humility of a desert ascetic. *P.Oxy.* LVI 3860, dated to the late fourth century, is a letter of woman to her absent husband, an *officialis* of the *dux*, probably at Alexandria, concerning a number of items and money she had received from several people which included 50 xestai of radish oil from her husband's brother (l. 22: καὶ ἔπεμψέ μοι ὁ ἀδελφός σου ῥαφανίνου ἐλέου ξέστας πεντήκοντα). From her husband's status and from the list of goods she received, and which she expected her husband to deliver, this woman's household, if not one of the elite at Oxyrhynchus, was one of high social rank. The 50 xestai of radish oil she received from her husband's brother undoubtedly went to illuminate her home and/or for use in her kitchen and on her table.

The appearance of quantities of radish oil produced in the Arsinoite and Oxyrhynchite nomes once again raises the question of whether the generic word ἔλαιον in the papyri should be taken as "olive oil" or more generally as "vegetable oil." The question comes to mind in view of the numerous citations of ἔλαιον in the customhouse duties accounts of the second century, particularly the majority of those which involve transportation from villages such as Soknopaiou Nesos and Bacchias in the Arsinoite nome. P.J. Sijpesteijn has treated these documents in fine detail in his *Customs Duties in Graeco-Roman Egypt* (Zutphen 1987). Under the rubric "ἔλαιον = olive oil" his footnote (p. 61, n. 10) reads "ἔλαιον can mean 'any oily substance.' I suppose that in the customhouse documents the word has its more specific meaning 'olive oil'." He goes on to state that

The customhouse documents mention ἔλαιον 181 times. In 105 cases we can establish that the oil is exported (in 14 cases no mention is made of import or export). We may, therefore, conclude that in other cases the ἔλαιον was exported as well... The number of attestations proves that ἔλαιον was a major export product of the Arsinoite nome.

Sijpesteijn makes the further point (p. 45) that ἔλαιον and other agricultural goods "were exported from the Fayum to Alexandria to feed its large population, some members of which happened to be the owners of the land from which the products came."

Sandy, *op.cit.* (above, n. 1) 18-24, has treated at length the question of unspecified citations of ἔλαιον in the Ptolemaic docu-

ments. He came to the conclusion that there were three uses for the term, the second of which was the only and obvious one applicable to radish oil (p. 24); namely, that the term ἔλαιον designates a specific oil when an adjective indicates that a particular oil is intended.¹⁰ There are four options for "oil" in the Ptolemaic papyri (castor, sesame, safflower, and olive), whereas, if the Edict of Prices is a reliable guide, there are only two in the Roman, olive and radish oil. In documents in which both oils are cited along with their price, the Roman, unlike the Ptolemaic, display in a number of instances the precaution of adding the word χρηστός after ἔλαιον to remove the ambiguity in identifying olive oil. There are 24 citations of ελαι- χρηστ- in the DDBDP, of which 7 appear in conjunction with a mention of radish oil: *BGU* I 14.4.20 (21)¹¹, 34.5.21 (22); *P.Abinn.* 66.3.52, 54 (50); *P.Bad.* IV 54.8 (6); *P.Ryl.* IV 627.8.186 (5.90), 630-7.156, 212, 256 (528); *P.Stras.* IV 299.v.10 (11).

The customhouse documents involving tariffs on ἔλαιον and other products appear to have been calculated as stated by A.C. Johnson, "at a fixed sum per measure or load, irrespective of value."¹² That being so, there was no need for the customs officials to investigate what kind of oil, olive or radish, was being transported in closed containers; nor was there any need for the shippers to spell out the distinction between the two by use of such terms as ἔλαιον ραφάνινον and χρηστόν. If Alexandria was the ultimate destination of the oil, it seems most likely that olive and/or radish oil were being shipped there since Alexandria, as evidenced from the documents, used both.

In sum, the evidence for the production of radish oil on a reasonably large scale in Fayum and nearby communities, should lead us to take a broader view of the possible meaning of ἔλαιον when, as in the case of the customhouse documents, the term appears

¹⁰ A check of the DDBDP for ελαι- ραφαν- produced 40 documents; ραφα- νελαι- yielded 13.

¹¹ The numeral in parentheses indicates the line number in the document that mentions radish oil.

¹² *An Economic Survey of Ancient Rome*. Vol. II: *Roman Egypt to the Reign of Diocletian* (Baltimore 1936) 591.

without qualification and presents us with an uncertain choice between two well-known oils. In those instances, it may be best to translate ἔλαιον conservatively as "oil" or "vegetable oil." In other cases, references to radish oil in the documents do not offer any uncertainty since they are made clear by spelling out the term as ἔλαιον ραφάνινον or ραφανέλαιον. That being said, the place of radish oil among the agricultural products of Roman Egypt deserves due recognition.

PHILIP MAYERSON

New York University