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SHORT REPORT

Between Archaeology and Text: The Origins of Rice Consumption and Cultivation in the Middle East and the Mediterranean

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I. Introduction

Asiatic Rice *Oryza sativa* L. (Poaceae) is a domesticated grain crop native to the tropical and subtropical regions of Asia, which presently ranks among the most important grains in a global diet. *Oryza sativa* is comprised of two distinct phylogenetic subspecies, namely *japonica* and *indica*, for which genetic evidence indicates at least two centres of domestication: the Lower Yangtze valley for the broad thick-grained japonica (c. 4000 BC) and the Gangetic basin for the thin elongated indica variety (c. 2500 BC) (Fuller et al 2010; idem 2011; Nesbitt et al 2010: 325–7). Modern genetics of landraces from northeast India may indicate a third distinct origin for the so-called *aus* rice varieties (Londo et al 2006: 9581–2). The genetic history of this taxon is further complicated by post-domestication hybridisation between domesticates and their wild ancestors as well as the presence of rarer forms like the aromatic rice varieties (*basmati* in South Asia and *sadri* from Iran) which may be of independent origin (Nesbitt et al 2010: 324–5).

In South Asia domesticated rice is attested at various archaeological sites in the Ganges basin from the mid-3rd millennium BC onwards. It subsequently appears at mature and late Harappan levels in north-western India (c. 2000 BC) before arriving at the edge of the eastern Iranian plateau at Pirak on the north Kachi plain in the early 2nd millennium BC (Costantini 1981; Fuller 2006: 36; Sato 2005). The presence of rice at Pirak heralds its gradual westward movement along the Iranian plateau via overland and perhaps even coastal routes into western Iran and Mesopotamia.

While much effort has been expended in the archaeological sciences over the past few decades to refine our knowledge of rice domestication in prehistoric East and South Asia, there have been few attempts to trace its westerly anthropogenic diffusion from those centres of domestication to the Middle East and the Mediterranean. Although rice is an important crop in the Middle East and the eastern Mediterranean by Late Antiquity (c. 250 - 600 AD), the earliest history of rice in those regions is unclear and its appearance in antiquity has primarily been discussed with the aid of Greco-Roman and Hebraic texts (Hehn 1887; Rabin 1966; Konen 1999). The materials for the study of rice cultivation in the ancient Middle East are, however, already to be found in Akkadian and Elamite, the written languages of Mesopotamia and southwestern Iran. Owing to substantial philological impediments, these texts have rarely been utilised in any discussion of rice

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cultivation in the ancient Middle East and the Mediterranean. I will attempt in this paper to integrate the diverse strands of archaeological and textual data in order to understand the spatial and chronological distribution of rice consumption and cultivation as well as postulate potential trade pathways along which rice was introduced into the Middle East and the Mediterranean.

II. The Archaeological Data

The archaeobotanical imprints of riziculture in the Middle East and the Mediterranean before the 1st century AD are meagre and of dubious value in assessing its agricultural potential. A single charred grain of rice was reported from the site of Hasanlu (ancient Gilzanu) in northwestern Iran from a pit dated by the excavators to 750–590 BC (Tosi 1975). Van der Veen (2011: 77), however, suggests that the single grain of rice from Hasanlu may be a misidentification of einkorn (*Triticum monococcum*) especially since subsequent archaeobotanical work at the site yielded no trace of rice at the 1st millennium levels (van der Veen 2011: 77). On a related note, einkorn grains recovered by Japanese researchers in the early 1970s at Sang-i Čakmaq, a Neolithic site in northern Iran, were also misidentified at the outset as rice, owing to the superficial morphological similarities between einkorn and rice (Fuller, personal communication).

As for the Mediterranean basin, the earliest positive strand of evidence comes from Mycenaean Tiryns where German excavators have identified a single uncharred grain of rice dating to the 12th century BC (Late Helladic IIIC) (Kroll 1982: 469). The hot and dry summers of the Argolid do not augur well for water-intensive rice cultivation and consequently this find, if not intrusive, must represent an exotic import rather than a locally cultivated taxon (Sallares 1991: 23). Egypt, where rice was eminently suited to grow in the Delta and Fayyūm oasis, has produced hardly any evidence for the cultivation and consumption of rice before the Greco-Roman period (Konen 1999: 34–5). Two 18th century French antiquarians had independently reported pieces of rice straw used as a binder on the gilded plaster covering of a statue of Osiris (de Caylus 1752: 14; Sonnini 1799: 253) but the current whereabouts and date of this statue remains ill-defined. While some modern scholarly works (Daressy 1922; Darby et al 1977: 493) are favourable to the testimony of the18th century French scholars, finds of rice straw, which are difficult to identify with certainty, should be treated as suspect.

Following a long dearth in data, the 1st century AD is relatively well endowed with rice finds from various Roman and Parthian sites across Europe and the Middle East. Somewhat unexpectedly Roman settlements beyond the Alps, namely Novaesium (Neuss am Rhein) and Mogontiacum (Mainz) in Germany and Tenedo (Zurzach) in Switzerland, have produced significant evidence for the consumption and ritual use of rice (Knörzer 1966: 433–443 ; idem 1970: 13, 28; Nesbitt et al 2010: 329; Furger 1995: 171; Zach 2002: 104–5). The Roman military encampment at Novaesium (Neuss) produced 196 charred grains of rice dating to the first quarter of the 1st century AD. These were recovered from a building identified as a military hospital (*valetudinarium*) suggesting that rice was valued for its medicinal properties, which are amply remarked upon in various Roman pharmaceutical and medical treatises. Dioscorides, for instance, notes that rice was 'moderately nutritious and it binds the bowel' (MM II.95 Beck 2011). Other finds are less substantial but offer different contexts for the use of rice. At Mogontiacum (Mainz), the capital of Germania Superior, a single grain of rice was found in a sacrificial pit at the temple of Isis and Magna Mater dating to the second half of the 1st century AD or slightly later (Zach 2002: 104–5).

As rice was not suited for growth in northern Europe these finds are undoubtedly imports from the Mediterranean and the Middle East by high-ranking Roman or Romanised functionaries, predominantly those associated with the military (Livarda

2011: 156). However, the social classes with access to rice and other exotic botanical produce may have been wider than the archaeobotanical evidence admits. A record of transactions from Vindolanda at the periphery of Roman Britain indicates, for instance, that Gambax, a soldier of humble rank, was able to purchase some black pepper (*piper*) for the small sum of 2 denarii (Tab. Vindol. II. 184).

As for the Mediterranean zone of the 1st century AD, rice finds are presently limited to the Red Sea ports of Egypt, namely Myos Hormos (Quseir al-Qadim) and Berenike (Medinat el-Haras) (van der Veen 2011: 46–7; Cappers 2006: 191) where the grains appear to be part of the foodstuffs brought by South Asian merchants for their own consumption. At Myos Hormos (Quseir al-Qadim) rice grains and husk fragments were recovered alongside Indian ceramics and Tamil Brahmi ostraca (Trenches 8 and 8A), indicating that rice was consumed on-site by Indian traders (van der Veen 2011: 46–7). Similarly the small quantities of rice recovered alongside Indian pulses like mungbean (*Vigna radiata*) from a 1st century AD dump in Berenike (Medinat el-Haras) would also suggest that the consumers were members of a South Asian trading diaspora rather than local inhabitants (Cappers 2006: 191; Wendrich et al 2003: 64). Rice prepared with mungbeans is a typical South Asian dish already referred to in later Vedic literature. The *Jaiminīyagṛhyasūtram* dating to the middle of the 1st millennium BC refers, for instance, to rice cooked in milk with mungbeans and seasame (*kuryāttilamudgamiśraṃ sthālīpākaṃ*) (Caland 1922: 12). Indicentally the transport of rice for the personal use of seafaring merchants (*saṃjattā-nāvā-vāṇiyagā*) alongside other essentials like oil, ghee, fresh water, medicines, weapons and clothes is mentioned in a narrative found in the *Nāyādhammakahāo*, an early Jaina didactic text (Naya. Mallī 8.49).

In the Middle East, the archaeobotanical evidence for rice cultivation in the 1st century AD derives exclusively from Susiana, modern-day Khūzestān province in Iran. A Parthian storage-room dating to the 1st century AD at Susa, the capital of the province, yielded 373 carbonised grains of rice alongside remnants of storage jars (Miller 1981). Additionally, rice hull impressions identified on bricks from several sites in the South Dez plain of Susiana, dating between 25 BC and 250 AD, indicate localised cultivation of rice (Nesbitt et al 2010: 326, 329; Miller 2011: 6). The cultivation of rice in Susiana has, as we shall shortly observe, a longer history than these finds would suggest.

If the archaeological data were to be read singularly, notwithstanding the vagaries of preservation and the uneven spatial sampling of ancient plant remains in the Middle East and the Mediterranean, we gain the impression that rice was relatively unknown in the Middle East and the Mediterranean before the 1st century AD. The immense spatial range covered by the rice finds of the 1st century AD argues, however, for a prolonged exposure to the crop. A gradual diffusion of rice consumption and cultivation certainly appears more historically cogent rather than a sudden adoption. The conservative character of ancient dietary habits is, in any case, affirmed by Plutarch who, reporting on other Indian cultivars in the Mediterranean, states: 'we know that many older people still cannot eat ripe cucumber, citron or pepper' (Quaest. Conv. 8.9 1–5 (731–4)).

The localised and skewed perspective provided by archaeological sources is best exemplified in the remarkable absence of rice from the substantial archaeobotanical assemblage of Vesuvian urban centres like Herculaneum and Pompeii, or indeed metropolitan Roman Italy as a whole, despite the presence of rice at provincial Roman sites (see above). A 1st century AD amphora from Herculaneum bearing a *titulus pictus* indicating that it contained rice (*orissa*) unsurprisingly confirms that rice was indeed consumed in the Vesuvian region despite eluding archaeological records (CIL IV 10756). The paucity of early archaeological data for rice is not, therefore, tantamount to its absence in earlier periods. Fortunately, the textual sources

are able to substantially amplify and clarify the limited archaeobotanical data and affirm that the cultivation and consumption of rice has a long genealogy in the Mediterranean and the Middle East.

III. The Textual Data

The earliest unambiguous references to rice consumption and cultivation in the Middle East and the Mediterranean derive from Greek and Chinese sources of the late centuries BC which are too well known to be rehearsed in detail here (Hehn 1887: 368–76; Konen 1999). Hieronymus of Cardia's reference to the armies of Seleucus and Pithon, the satraps of Babylonia and Media, subsisting on rice during their passage through Susiana in the late 4th century BC is particularly notable (Diod. XIX.13.6). Strabo, probably citing Alexander's companion Aristobulus, notes that rice grew in Bactria, Babylonia, Susiana and Lower Syria (XV.1.18). Rice may have been familiar in the Greek world by the 5th century BC since a fragment of Sophocles' *Triptolemus* refers to bread made of rice (ὀρίνδην ἄρτον) (Ath. III. 110e). Among the standard fixtures of ethnographic enquiries in the imperial histories of China, rice-eating civilisation par excellence is the question of whether rice grew in foreign lands. Zhang Qian, the earliest Han ambassador to Central Asia in the 2nd century BC, notes that rice grew in Parthia (*Anxi*) and Mesopotamia (*Tiaozhi*) (Shiji Dayuan 123). The casual references of Greek and Chinese commentators to the cultivation of rice in Mesopotamia and Susiana in the last centuries of the 1st millennium BC hint at a longer history of rice cultivation in the Middle East.

In this respect, the less well-known textual sources in Akkadian and Elamite, the ancient languages of Mesopotamia and southwest Iran respectively, contain important early references to rice cultivation although the knowledge thereof has been hitherto restricted to cuneiform specialists. Rice has been convincingly identified, on the basis of Iranian and Turkic cognates (e.g. Middle Persian *gwrync*; New Persian *guranǰ/gurinǰ*) and contextual grounds, with the Akkadian term *kurângu* (Thompson, 1939: 180–1; idem 1949: 106; Muthukumaran unpublished). The reservations on this identification primarily stem from the misleading assumption that *kurângu* is a word of Indo-Iranian extraction and hence its presence as early as the 12th century BC would be anomalous (Salvini 1998: 188; Jursa 1999/2000: 294). The term *kurângu* is, however, certainly not of Indo-Iranian derivation (Skt. *vrīhi*) and there is, in any case, already one other word of Indo-Iranian origin attested in 12th century BC Mesopotamia (Bactrian camel: Akk. ^{anše}*udru* cf. Skt. úṣṭra).

The earliest Akkadian textual record for rice, dating to the late 12th century BC, derives from a clay tablet found at Kaḫat (Tell Barri), a site east of the Jaghjagh tributary in the Ḫābūr triangle in modern Syria (Salvini 1988 K9.T1). In this Late Middle Assyrian administrative text (c. 1100 BC), a certain official Erīb-īli writes to his subordinate in Kaḫat asking if there was enough rice (*kuriangu ibašši laššu*) and requests for someone to irrigate (*lišqi*) the fields:

'Speak to Kalbu, thus Erib-ili: I am well. Is there rice or not? Why have you not written news to me? Let someone go to Qalliya and ask him for water and let him irrigate (the fields). Bring an *abaruḫu*-tool to Ṭab-ṣiya' (translated by the author).

This text complements the single grain of rice recovered from Mycenaean Tiryns which could otherwise easily seem like an intrusive find. Later references to *kurângu* largely derive from the lexical and epistolary materials found in imperial Neo-Assyrian archives of the 8th and 7th centuries BC. These texts indicate that the cultivation of rice was well-established in the heavily-irrigated Assyrian heartland (northern Iraq) although it was in no way a competitor with barley or the assortment of wheats (emmer, einkorn, timopheevoid wheat) which were the staples of Syro-Mesopotamian agriculture (Muthukumaran, unpublished).

The Elamite references to rice, *miriziš*, a relatively straightforward loanword from the

Old Persian **vrīziš* (Skt. *vrīhi*; Pašto *vriži*), are to be found in the Persepolis Fortification Archive which dates to the early Achaemenid period (late 6th - 5th centuries BC). While the references to *miriziš* are meagre the administrative texts from Persepolis unmistakably attest to the cultivation of rice at localities such as Liduma (modern Jenjān) and Kurra on the royal route between Persepolis and Susa in the Fahliyān region of Fars province (PF 544; PFNN 587).

IV. Routes and Modes of Dissemination

Despite the availability of earlier textual attestations for rice in Akkadian and Elamite, the manner and precise date in which rice was introduced into western Iran and Mesopotamia remains obscure since the earliest extant reference to rice from Kaḫat is casual and does not suggest that it was an unfamiliar crop. It may well be the case that rice was transported by eastern Iranian merchants, trading tin, gold and lapis lazuli along the plateau routes, for their own consumption much like the Indian traders who brought rice along the monsoon trade routes to Egypt in the 1st century AD. The barter of surplus grain at the end-destination could provide a likely scenario for the earliest tasting of rice in western Iran and Mesopotamia from where whence it spread further west into the eastern Mediterranean. Further bio-archaeological enquiries in eastern Iran and Central Asia could perhaps elucidate the processes by which rice spread from the western periphery of South Asia to the Middle East in the late 2nd millennium BC. Phytolith analysis from Tuzusai in southern Kazakhstan indicates that rice cultivation was established there by the Late Iron Age c. 300 BC (Rosen et al 2000: 620–2) but otherwise the present state of knowledge concerning the earliest history of rice in eastern Iran and central Asia is deplorable.

V. Conclusions

Although rice was already a cultivar in Mesopotamia from at least the 12th century BC, it remained a marginal subsistence crop for most of antiquity. Beyond any cultural preferences which must have exercised a substantial influence on crop choices, the intensive labour and water requirements of rice cultivation dissuaded large-scale cultivation of rice across the Middle East and the Mediterranean until at least Late Antiquity and the early Islamic period when more efficient use of water yielding technologies in the form of the water wheel and extensive irrigation works emerged. Nonetheless rice formed a notable constituent of an increasingly diversified Iron Age agricultural regime, undoubtedly spurred by risk-minimization strategies on the part of individual producers. The state must have also played a weighty role in the adoption of new cultivars. Pliny, for instance, remarks on an Indian millet introduced into Italy during his own lifetime (NH XVIII.10.55). In the case of rice, the Akkadian and Elamite textual sources indicate that rice was integrated into a state-run system of rations for provisioning the bureaucracy and labour force.

Interestingly, the modes of food processing associated with rice in South Asia did not migrate along the trade routes which brought the new cultivars. Rice was predominantly consumed in the ancient Middle East and the Mediterranean in the form of bread, porridge or cake, much like barley and wheat. In some regions of the Middle East, like Susiana and the lowlands south of the Caspian Sea, rice would eventually come to supplant barley and wheat as the principal staple crop but elsewhere it remained a luxury until recent times, a status echoed in the old Arab folk saying: What do the people of paradise eat? – rice in butter (Zubaida 1994: 93).

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