This essay revisits Leach’s thesis that American sweet potato (Polynesian kūmara) was first introduced into the Pacific as a variation on Dioscorea yam by Polynesian voyagers returning from South America. A review of early agricultural systems on both sides of the first transoceanic kūmara transfer clarifies South American disinterest in Polynesian cultivars, but not necessarily why sweet potato was transferred to Oceania as a lone, yam-like root crop. Archaeologists working on Rapa Nui and northern South Island (New Zealand) have identified early kūmara cultivation in dry soil planting pits that conform to a widespread Oceania yam agronomy. Historical ethnobotany sources from Hawai‘i reinforce a Polynesian pattern of kūmara production in three to six months from planting pits and mounds, compared to nine months or more for yam. Northern South Island evidence also confirms that the planting pit method could provide for kūmara cultivation in free-draining soils of low to medium fertility in a climate where yam would not grow. I propose a model in which Polynesians selected South American kūmara for transoceanic transfer as a fast growing, hardy survival yam. These versatile kūmara qualities may even have encouraged the last great voyages of Oceanic exploration to remote southern Polynesia.

Este ensayo revisita la tesis de Leach, la cual sostiene que la batata americana (kūmara en las lenguas de Polinesia) fue introducida por primera vez en el Pacífico como una alternativa al ñame Dioscorea por navegantes polinesios quienes regresaron desde América del Sur. Una revisión de los sistemas agrícolas existentes en Polinesia y Sudamérica durante la primera transcreación transoceánica de kūmara permite confirmar el descubrimiento de América del Sur en las cultivaciones de Polinesia, pero no explica por qué la batata fue trasladada a Oceania como un tubérculo solitario similar al ñame. Arqueólogos trabajando en Rapa Nui y el norte de la Isla del Sur en Nueva Zelanda han identificado cultivo temprano de kūmara en pozos de plantación con suelos secos, técnica utilizada en la agrología general de ñames en Oceania. Estudios históricos de ethnobotánica de Hawai‘i refuerzan el patrón polinesio en la producción de kūmara en la cual se caracteriza por una duración de tres a seis meses para el cultivo en pozos de plantación y montículos, en comparación con los nueve meses o más requeridos para el cultivo de ñame. evidencia del norte de la Isla del Sur de Nueva Zelanda también confirma que el método de cultivo de pozos de plantación permitiría la cultivación de kūmara en suelos con buen drenaje y de mediana a baja fertilidad en un clima donde el ñame no crece. En este estudio se propone un modelo en el cual el ñame había sido seleccionado para la transcreación transoceánica de visitantes polinesios en Sudamérica como un tipo de ñame de crecimiento rápido y que requería de poco mantenimiento para su sobrevivencia. Estas cualidades versátiles de los kūmara podrían haber motivado las últimas grandes travesías Oceánicas de exploración hacia el sur de la Polinesia remota.

Introduction

The first transoceanic journey of American sweet potato (Ipomoea batatas (L.) Lam.) and its dispersal to the Polynesian margins as the underground stem crop kūmara is one of the most persistent problems of Pacific ethnobotany (Ballard et al. 2005; Yen 1974). Debates over transoceanic sweet potato transfers have included suggestions of avian-borne or sea-raked kūmara origins (e.g., Bahn & Flenary 1992:52-54; Montenegro et al. 2008; Zhang et al. 2004). The last are difficult to model plausibly, however, on both botanical and agronomic grounds (Baker 1971:43-34; Green 2005:43-44; Montenegro et al. 2008; Yen 1974:2-3, 265-266). The proposal that sweet potato was first introduced into Oceania with the advent of post-fifteenth century Iberian voyaging in the Pacific (e.g., Mcgrall 2001:398; see also summaries in Scaglion 2005 and Yen 1974:3, 5-12) is also countered by botanical kūmara identifications to varying levels of assurance from archaeological

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A fast yam to Polynesia: New thinking on the problem of the American sweet potato in Oceania

Ian G. Barber

This essay revisits Leach’s thesis that American sweet potato (Polynesian kūmara) was first introduced into the Pacific as a variation on Dioscorea yam by Polynesian voyagers returning from South America. A review of early agricultural systems on both sides of the first transoceanic kūmara transfer clarifies South American disinterest in Polynesian cultivars, but not necessarily why sweet potato was transferred to Oceania as a lone, yam-like root crop. Archaeologists working on Rapa Nui and northern South Island (New Zealand) have identified early kūmara cultivation in dry soil planting pits that conform to a widespread Oceania yam agronomy. Historical ethnobotany sources from Hawai‘i reinforce a Polynesian pattern of kūmara production in three to six months from planting pits and mounds, compared to nine months or more for yam. Northern South Island evidence also confirms that the planting pit method could provide for kūmara cultivation in free-draining soils of low to medium fertility in a climate where yam would not grow. I propose a model in which Polynesians selected South American kūmara for transoceanic transfer as a fast growing, hardy survival yam. These versatile kūmara qualities may even have encouraged the last great voyages of Oceanic exploration to remote southern Polynesia.

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contexts on Rapa Nui, Mangaia (Cook Islands), and Huahine are assumed to pre-date any European introduction (Figure 1 and references or examples in Barber 2004:189-90; Coe & Kirch 2005:74; Green 2005:50-51; Hather & Kirch 1991; Hoopes & Erickson 2005; Ladehoger et al. 2005; Wallin et al. 2005:86-87; Yen 1974:27; Yen & Head 1993). In fact, there are archaeological indications that sweet potato was a relatively early transoceanic transfer, including a bracketed 1000-1400 radiocarbon age for archaeological sweet potato tissue from Mangaia (Hather & Kirch 1991), and the inference of temperate kūmara cultivation from the first new Zealand settlement by about the thirteenth century AD (Barber 2004). Most archaeologists now believe that early Pacific voyagers transported sweet potato into Oceania as remote East Polynesia was colonized during the later first to early second millennium AD (Green 2005; Irvine 2011). In spite of these strong indications of sweet potato antiquity in Oceania, there are no archaeological or ethnohistorical indications that kūmara was ever more than a relatively minor crop in the likely receptor islands of tropical East Polynesia (Green 2005; Yen 1974:260). Furthermore, even in the probable South American coastal source region, sweet potato was but one of a number of edible local root crops (Pearsall 1992). Across the eastern Pacific basin, kūmara became economically and ritually important only upon reaching the apices of the late first to early second millennium AD. Therefore, especially concerned to investigate the early cultivation of kūmara in the Pacific. Leach’s new yam thesis is evaluated against the following research question.

• What explains the cultural selection, transfer and selective cultivation of sweet potato in Polynesia?

I begin with a review of the evidence for agricultural systems and adaptations on both sides of the first transoceanic kūmara transfer to consider why new crops were, or were not, selected. I then test the new yam thesis against archaeological evidence of early dry field agriculture in coastal southern Peru (Heyerdahl 1969). This study, I am especially concerned to investigate the early cultivation of kūmara in dry soil planting pits that appear to derive from a widespread, cognate, Oceanic agronomic tradition.

Pre-Columbian Food Production Systems at the First Meeting of South Americans and Polynesians

The American sweet potato trailhead to Polynesia remains a matter of debate, with coastal Peru (Hoyes 1952:428-39) and the Gulf of Guayaquil south of the Gulf of Guayaquil to central Chile (Engelbert 1952:428-39) the Gulf of Guayaquil region (Scaglion 2005; Scaglion & Cordero 2011) both in contention on linguistic and other grounds. The opportunities for pre-contact transfer of sweet potato and gourd transfers from and to Polynesia to tell us about the process of cultural transfers and diffusion in Oceania, and beyond?

New research offers hope that the core problem is not insoluble. Scholars have access to a diverse and growing range of archaeological, other scientific (including DNA) and ethnobotanic data across Polynesia to investigate the sweet potato transfer process. Theoretical models of a more robust database (Ballard et al. 2005; Jones et al. 2011). There is another botanical clue to work with as well. The Polynesian gourd, Lagenaria siceraria, is now linked contextually with the Americas. Theoretically, gourd may have been transferred naturally to Polynesia (Chile) is now linked to any European introduction (Figure 1 and references or examples in Barber 2004:189-90; Coe & Kirch 2005:74; Green 2005:50-51; Hather & Kirch 1991; Hoopes & Erickson 2005; Ladehoger et al. 2005; Wallin et al. 2005:86-87; Yen 1974:27; Yen & Head 1993). In fact, there are archaeological indications that sweet potato was a relatively early transoceanic transfer, including a bracketed 1000-1400 radiocarbon age for archaeological sweet potato tissue from Mangaia (Hather & Kirch 1991), and the inference of temperate kūmara cultivation from the first new Zealand settlement by about the thirteenth century AD (Barber 2004). Most archaeologists now believe that early Pacific voyagers transported sweet potato into Oceania as remote East Polynesia was colonized during the later first to early second millennium AD (Green 2005; Irvine 2011). In spite of these strong indications of sweet potato antiquity in Oceania, there are no archaeological or ethnohistorical indications that kūmara was ever more than a relatively minor crop in the likely receptor islands of tropical East Polynesia (Green 2005; Yen 1974:260). Furthermore, even in the probable South American coastal source region, sweet potato was but one of a number of edible local root crops (Pearsall 1992). Across the eastern Pacific basin, kūmara became economically and ritually important only upon reaching the apices of the late first to early second millennium AD. Therefore, especially concerned to investigate the early cultivation of kūmara in the Pacific. Leach’s new yam thesis is evaluated against the following research question.

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faunal and material culture links between Polynesia and the Americas were proposed, but also contested (Anderson 2006; Arnold 2007; Bahn & Flennery 1992:38-68; Gongora et al. 2008; Heyerdahl 1952, 1980; Jones & Klär 2005, 2006; Jones et al. 2011; Langdon 2009 1920-1970; Storey et al. 2008; Van Tilburg 1994-79, 130-31). Even if one allows that these other claims are credible, it is important to note that all of the proposed pre-Columbian plant and animal introductions to the islands of Polynesia for sweet potato and plantain goard are highly localized. If confirmed, these other introductions would appear to represent low-impact outcomes from isolated contacts only (Barber 2009).

Transfer of Americans or Polynesians?

Heyerdahl (1952, 1980), Langdon (2001, 2009) and Anderson et al. (2007) have all argued that South American people on rafts may have introduced sweet potato into Polynesia. Archaeological and historical representations from coastal Ecuador to Peru showing various details of sea-going vessels under sail with directional cardboards raise the theoretical possibility of American voyaging in the Pacific (Heyerdahl 1980:201-28). The feasibility of drift voyaging from South America to East Polynesia, potentially assisted by sail, has been demonstrated experimentally and in simulation (Anderson et al. 2007:126; Heyerdahl 1952; Montenegro et al. 2008). Yet the successful, purposeful settlement of small island groups of the western Pacific by Eastern Pacific is evidence of considerable Polynesian voyaging tenacity and skill as well. In particular, the Polynesian push beyond a west-to-east colonizing trajectory to settle far northern Hawaii and distant southwestern New Zealand (especially) represent remarkable feats of maritime exploration that may well have involved return voyages of many months duration (Irwin 1992, 2011). To most researchers of the subject, voyaging Polynesians are more likely agents of the first sweet potato transfer than South Americans with no tradition of long-distance Pacific island exploration (Green 2005; Irwin 2011, Kirch 2000:241-43).

Choice and Selection

The transfer of sweet potato that resulted from this first Polynesian-American meeting, however and wherever it occurred, did not take place in a botanical vacuum. Each party brought specialist agronomic knowledge, preferences, and productive and cultural landscapes to the encounter.

In the course of remote Pacific colonization, the most favorable tropical agricultural environments were the leeward islands where orographic rainfall patterns encouraged distinctive wet windward and dry leeward planting systems over time. On windward island aspects in particular, raised garden beds between channels took advantage of poorly drained or naturally wet lands where water tables were high enough to facilitate fresh water flows and nutrient dispersal, especially for taro production. Taro was otherwise grown in irrigated pondfields, unmodified wetlands, or in deep pits (Addison 2008; Kirch 1994; Spriggs 2002; Storey et al. 2008, Van Tilburg 1994-79, 130-31). Even if one allows that these other claims are credible, it is important to note that all of the proposed pre-Columbian plant and animal introductions to the islands of Polynesia for sweet potato and plantain goard are highly localized. If confirmed, these other introductions would appear to represent low-impact outcomes from isolated contacts only (Barber 2009).

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Around the Moche Valley, for example, the largest irrigation system in South America was constructed under the central administration of Chan Chan, the capital of the imperial Chimú polity, between AD 500-1000 (Billman 2006; Mosley 1983).

Sunken fields that were naturally and in some cases, artificially water-fed supplemented Peruuvian irrigation systems (Kautz & Keatinge 1977; Knapp 1982; Matheny & Gurr 1983; Mosley 1969; Mosley & Feldman 1984; Parry 1980). A 1550 Spanish account describes “the valley of Chilca, where...no water is seen to fall from the sky nor does any river or stream pass through it, yet the greater part of the valley is full of plantings of maize and tubers and fruit trees” (Pedro de Cieza de Leon as cited in Rowe 1999:34). Billman (2006) documents two groups of “simple water table farming plots” from ca. 2000 BP at Viru, suggesting the antiquity of this method. A 1550 Spanish account describes “the valley of Chilca, where...no water is seen to fall from the sky nor does any river or stream pass through it, yet the greater part of the valley is full of plantings of maize and tubers and fruit trees” (Pedro de Cieza de Leon as cited in Rowe 1999:34). Billman (2006) documents two groups of “simple water table farming plots” from ca. 2000 BP at Viru, suggesting the antiquity of this method. In the hypothetical first meeting of Polynesian and South American agronomists, water-loving taro would have been an easily available crop to Peruuvian cultivators at least, while the relatively lengthy Pacific yam growing season would compare unfavorably to potato varieties. Consistently, Asia-Pacific root crops are not recorded in any pre-Columbian America context. The coconut (Cocos nucifera) represents the only plausible, if still debated, pre-Columbian plant introduction from the Pacific (Green 2005; Irwin 2011:257-258; Storey et al. 2011:129-132). For Polynesian visitors, in contrast, Peruuvian agriculture offered a range of new fruit, seed and tuber crops that could be grown successfully in sun-baked settings comparable to yam and taro planting pits and wetland or raised bed Oceanic fields and puke. This variety highlights the problem that only a single America cucurbet and a solitary tuber were transferred on westward voyages, along with one or two other minor crops (Langdon 1996; Storey et al. 2011).

For Green (2005:47), the selection of sweet potato and gourd can be related to root and seed crop familiarity and disturbance of coastal ecosystems (Horrocks & Wozniak 2008:136). From the north-east coastal La Perouse location, an “extensive” (30ha) lithic mulch field system with a “dense” cover (grain size 5-20cm) is associated with a fast yam to Polynesia: New thinking on the problem of the American sweet potato in Oceania. 

A New Yam for Polynesia

There is no evidence that specialist America agronomic technologies were transferred with the kūmara (Barber 1979; 2010), consistent with the thesis that sweet potato was selected as a variation on a Pacific cultigen. When it would seem that sweet potato was not cultivated in irrigated fields or reticulated raised beds anywhere in Polynesia (Best 1976; Handy et al. 1991; Kirch 1994; Yen 1974). This is in contrast to archaeological and historical evidence of raised bed or mounded sweet potato cultivation in at least some water-fed South American field systems (Denevan 2001; Yen 1974:65-148.53). The relationship between kūmara and yam agronomy in early Polynesia can be evaluated further from archaeological and ethnobotanical evidence.

Archaeology

Two early dry field trajectories are identified in Rapa Nui and New Zealand at the subtropical eastern and temperate southwestern Polynesian margins respectively (Figure 1). On Rapa Nui, the early dry cultivation of plants in purpose-dug pits and the surface application of stone covers to act as a ‘lithic mulch’ have been recognized only since the 1980s (Stevenson & Haos 1998; Stevenson et al. 1999:808; Wozniak 1999). These practices are identified in sequence, and sometimes in combination, at sites investigated across the island (Wozniak 1999:129-132). For Polynesian visitors, in contrast, Peruuvian agriculture offered a range of new fruit, seed and tuber crops that could be grown successfully in sun-baked settings comparable to yam and taro planting pits and wetland or raised bed Oceanic fields and puke. This variety highlights the problem that only a single America cucurbet and a solitary tuber were transferred on westward voyages, along with one or two other minor crops (Langdon 1996; Storey et al. 2011).

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Strikes, insubordination, theft and disobedience. Between the rebellion of Angata and Rapanui struggles for civil rights the police, the Company in the Company, which not only presented itself as a identify who was responsible for their intense oppression Company between the business and the Rapanui. As a result, the of wage-labor relations of production established regardless of State institutions and the Company. Equally, of the colonial presence on Rapa Nui: livestock profits.

Institutional structure and the existence of significant workings of colonial power.

such as rebellion, livestock theft, insubordination, of practices that negated the recognition of authorities, and the need to confront the adverse conditions to which constituted by the "Provisional Temperament" in 1917 situation imposed by the precarious "colonial pact" to this was the role played by the group of islanders mediators between the population and the authorities. mentioned above, who, collaborating closely with

Notes

Bornier, Tuki Kaituoe and from a later date, the children mestizo we can mention, apart from Juan Tepano, were Juan

To summarize, while the forms of resistance forms of resistance, post-Angata rebellion, constitute not mediators between the population and the authorities.

1. According to the 1929 census, work professions on the 6. During these years this institution successfully played

3. Medical work was undertaken, during these years, by 4. During these years this institution successfully played

Notes

To summarize, while the forms of resistance...
A fast yam to Polynesia: New thinking on the problem of the American sweet potato in Oceania

Figure 3. “Typical” lithic mulch soil profile published by Wozniak (1999). Figure 2A from the Ti Niu sampling area, Rapa Nui (see Figure 2). The lithic mulch layer is 30-40 cm deep above an agricultural “plaggen” soil that is “dark brown...rich in organic material...light and porous in texture” (Wozniak 1999:6, Figure 2A). Two planting pits of “darker soil” intrude from the lower plaggen horizon into a clay rich B-Horizon. The B-Horizon is characterized by pores formed by Ashera palm roots from the pre-agricultural forest (Wozniak 1999:7, Figure 2A; see also Stevenson et al. 2006).

Figure 2B. Typical lithic mulch and plaggen soil profile from Ti Niu, Rapa Nui. The typical plaggen soil includes several layers of organic material (lithic mulch) that is 30-40 cm deep above a clay rich B-Horizon. The B-Horizon is characterized by pores formed by palm roots with occupation between AD 1400-1700 on the flat Maunga Puko Pahi hilltop (Stevenson & Haoa 1998; Stevenson et al. 1999), although the extent of mulch construction there is unclear. Below the hilltop, dated charcoal from a planting pit beneath (and not clearly associated with) a lithic mulch soil is calibrated AD 1149-1398, while a single “carbon fleck” from a planting pit associated with lithic mulch is dated AD 1460-1632 (2-sigma calibration) (Wozniak and Stevenson 2008:62, 72, 77; cf., pp. 72, 77).

Planting pits filled with fertilizing and, perhaps, moisture-retaining materials would have ensured the availability of a nutritious matrix around the plant. These pits may have been deepened in drier years (Stevenson et al. 2006:934). The identity of cultivars within these features is not directly confirmed. Probable *Ipomoea* microbotanical remains are reported from the anthropogenic Ti Niu soils (along with yam and taro), although there is as yet no unequivocal botanical identification of sweet potato from early agricultural features (Horrocks & Wozniak 2008). Stevenson et al. (2006:922, 934) propose that sweet potatoes were cultivated in shallow planting pits, while “deeply rooted crops” were grown in deeper pits.

Crop identification is more straightforward in archaeological fields of cooler central New Zealand extending to eastern South Island Banks Peninsula. Here pre-contact Māori cultivation was restricted to gourd and *kāmaro* in general. Dry *taro* is reported in one archaeological situation only while yam will not grow in this relatively cool New Zealand region (Barber 2004, Leach 1984).

As discrete site types, planting pits and constructed, rocky cultivation soils that retained heat and assisted with occupation between AD 1400-1700 on the flat Maunga Puko Pahi hilltop (Stevenson & Haoa 1998; Stevenson et al. 1999), although the extent of mulch construction there is unclear. Below the hilltop, dated charcoal from a planting pit beneath (and not clearly associated with) a lithic mulch soil is calibrated AD 1149-1398, while a single “carbon fleck” from a planting pit associated with lithic mulch is dated AD 1460-1632 (2-sigma calibration) (Wozniak and Stevenson 2008:62, 72, 77; cf., pp. 72, 77).

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into natural sand at the base of a homogenized L1-L2 unit as recorded in a road cutting across a gentle coastal slope (Figure 5). Calibrated dates on marine shell and short-lived charcoal from L1 to upper L2 middens at Takapou, Tata Beach and Ligar Bay all converge about the sixteenth century AD (Barber 1999, 2003:440, in press a). No dates are available on the L2 planting pits cut into sterile sand in any of these locations. These basal pits represent, however, the first human imprint in this area.

Comparably rounded archaeological pits 40-60cm wide and usually about 20cm deep have been investigated at Triangle Flat, northwestern Golden Bay. These pits intrude from the base of a black sand, Māori cultivation A-Horizon into a natural, beach shell and sand ridge (Figures 6 & 7). The pits are sometimes capped by discrete beach shell lenses applied as a hard surface mulch (Figure 7). Starch grains comparable to Ipomoea are identified in the microbotanical analysis of fill from a set of aligned, shallow pits, while starch grains

Figure 5. Archaeological planting pits identified by dark sand fill (2) cut into natural, light yellowish brown sand (3), shown in exposed slope section, Ligar Bay, eastern Golden Bay (Photo by Ian Barber, 2006).

Figure 6. Planting pit cluster in excavation plan, Triangle Flat, northwestern Golden Bay (see Barber in press b for further context). Starch grains comparable to Ipomoea are identified in black fill from a pit in this cluster (Barber in press b, Horrocks et al. 2004:155).

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“powdery and dry”, the earth was heaped into small mounds only, with sweet potato slips “placed vertically in holes made with the digging stick” so that “the base of the cutting is six to eight inches in the ground” (see also Handy et al. 1991:117 for a traditional account of sweet potato planting holes).

Other Hawaiian observers reinforce the point. Kamakau (1976:24) described excavations for sweet potato slips as “planting holes”, while Malo (1951:205) noted that “the soil was raised into hills … or the stems might merely be thrust into the ground anyhow, and the hilling done after the plants were grown.” The reports by Handy et al. in particular suggest that sweet potato planting holes were dug in very dry soil conditions (cf. Handy et al. 1991:131 on the practice of sweet potato “high mounding” in damp soils). This evidence is consistent with the convergence of Oceanic yam and kūmara planting techniques identified above in the early Polynesian archaeological record.

Ethnobotanically, accounts also highlight important growth advantages of sweet potato over dry yam and kūmara. “In particular,” Leach (2005:69) has observed “sweet potato could be planted at any time of the year [in tropical Polynesia], using sections of vine, in contrast with yam which was planted seasonally using tuber sections.” For planters in “Old Hawai’i”, Handy et al. (1991:127) noted, sweet potato was “more valuable” than taro “in three ways”:

- “It can be grown in much less favourable localities, both with respect to sun and soil; it matures in three to six months (as against nine to eighteen months for comparable to taro are identified in a rare 50cm deep pit (Figure 6, Barber 2004:189-190 and Figure 8.5, in press b; Horrocks et al. 2004:149-51, 155). A minimum age for Triangle Flat planting pits is derived from a cluster of calibrated marine dates from midden deposited above, but not in direct association with, several pit features. At two sigma, these Triangle Flat midden dates all overlap about the sixteenth century AD (Barber in press b).

These northern South Island planting pits may well represent a cognate, early Polynesian agronomy. Beyond the Rapa Nui evidence discussed above, comparable archaeological dry soil features are recorded on Hawai‘i Island (Allen 2004:198, 216) and from North Island Māori cultivation sites in the Hamilton region of the Waikato River basin (Gumbley et al. 2004) and (with a little less certainty) on Moturua Island, northern Bay of Islands (Peters 1975). It is of particular comparative note that kūmara were cultivated in light soils in some early, shallow Rapa Nui pits and in sandy soils in early, and similarly shallow, northern South Island pits.

Ethnobotany

The rich Hawaiian ethnographic record in particular identifies kūmara plantings in pits as well as mounds, frequently in combination. From dry slopes on Maui and Hawai‘i in the Hawaiian group, Handy et al. (1991:131) reported kūmara cultivation in “small pockets” of disintegrating lava where fertilizer, fine gravel and stones were gathered around the vines “without much mounding”. Further to the observation that “ancient Hawaiians planted potatoes in mounds,” Handy et al. (1991:130-131) also observed that where the soil was”powdery and dry”, the earth was heaped into small mounds only, with sweet potato slips “placed vertically in holes made with the digging stick” so that “the base of the cutting is six to eight inches in the ground” (see also Handy et al. 1991:117 for a traditional account of sweet potato planting holes).

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- “It can be grown in much less favourable localities, both with respect to sun and soil; it matures in three to six months (as against nine to eighteen months for...
With respect to the first point, Handy et al. (1991:128) observed that “clay appears to be the only soil or sediment that potatoes cannot adapt themselves into.” Thus, sweet potato cultivars are reported from humus-rich soils as well as “gravelly semi-decomposed lava” and “in white coral sand mixed with red soil” (Handy et al. 1991:128-129). On the sweet potato growth advantage, Handy et al. (1991:101-179) noted that even highly productive wet (irrigated) taro crops require six to eight months until maturation, while yam tubers mature after nine months or longer. Malo (1951:42) observed that “the uala [kūmara] grows abundantly on the kula lands, or dry plains” and “ripens quickly, say in four or five months after planting.” Kamakau (1976:27) also described fast-growing sweet potato varieties “which prevented famine because they bore quickly...as soon as the vines spread out on the mounds they would begin to bear, and in four or five weeks after planting the mounds were full of potatoes.” These ethnohistorical insights begin to clarify the early agricultural record in marginal Polynesia. Planting pits dug into free-draining sandy soils of coastal northern South Island dunes and slopes extended a yam-like agronomy into a relatively infertile growing medium and cool climate that Dioscorea – yam would neither thrive. Opportunities and options for dry farming agriculture may have been important factors also in the planting pit cultivation of kūmara in some less fertile Rapa Nui soils and locations (Louwagie et al. 2006). Furthermore, in kūmara origins, it seems plausible that hardiness and the relatively short sweet potato growth season were both important considerations for long distance voyagers in the eastern Pacific facing in uncertain landing. Certainly, there is no evidence otherwise that sweet potato storage qualities were necessarily superior to yam for the purposes of ocean transport. Thus, Handy et al. (1991:180) observed that “yams were preferred to sweet potatoes by the captains of Europeans ships because they kept better at sea.”

Discussion and Conclusion

With respect to kūmara, this essay concludes that transoceanic diffusion can be modeled as part of a cultural process rather than an accident or some inexplicable choice. The first American-Polynesian contact can be explained as the extension of a determined and successful west to east colonisation pattern that had been the Polynesian journey – the exploration and colonization of the southern margins. As noted above, this was an extraordinary feat, as New Zealand lies beyond the predictable winds and currents of equatorial to subtropical Polynesia. Given the likely aniquity of transoceanic contact, it seems that the sweet potato was transferred into a recently settled, East Polynesian home base where populations were experiencing in and included towards long-distance ocean voyaging. Given the versatile, fast cropping qualities of the sweet potato cultigen, it may have seemed that kūmara was “preadapted” to temperate climate (Kirch 1999:275-276) and its adaptation to the tropical Polynesian environments and circumstances has been an important stimulus to tropical Polynesian leaving on the last great long-distance journey of ocean exploration to the cold south. 

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References


Note

1. Heyerdahl (1952:501-504, 1980:230) has proposed that the widely dispersed East Polynesian dog (ulu) was a prehistoric American introduction also. However, while the dog is absent from “nuclear parts of Melanesia” such as New Caledonia and Vanuatu in European contact records (Heyerdahl 1952:504; 1980:230), linguistic and archaeological evidence links the dog (proto-Polynesian *kanu) with Polynesia. Anderson 2002:77-78; Kirch & Green 2001:121, 129; Summerhayes 2007:148). Available haplotype evidence from limited mtDNA sampling also identifies discrete Pacific and pre-Columbian American dog populations with no evidence of contact (Stoey et al. 2011:129).

Acknowledgements

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Strikes, insubordination, theft and disobedience. Between the rebellion of Angata and Rapanui struggles for civil rights

Carlos A. Recabarren

Here. With nothing else to add I send my greetings,

condition: the signatures of all the representatives

Los representantes, reunieron a la jente en la Plaza

esta guelga jeneral. Señor Administrador; agradeceré

ésta Subdelegación las firmas de los representantes de

habitantes de ésta Isla, queda arreglado y todo el

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