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THE VIRTUOUS MANIOC AND THE HORNY BARBASCO: SUBLIME AND GROTESQUE MODES OF TRANSFORMATION IN THE ORIGIN OF YANESHA PLANT LIFE

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Like other native Amazonian peoples, the Yanesha of eastern Peru conceive of plants and trees as having been primordial human beings transformed into their present form at the end of mythic times. The events that led to their transformation can be described as being either ''sublime'' or ''grotesque.'' Cultivated plants that underwent a sublime mode of transformation include manioc, the Yanesha staple, as well as maize, beans, peanuts, and cotton. These plants assumed their present form as the result of the self-transformation of powerful demiurges; a luminous, contained transformation that privileged the sensual capacities of the upper body. In contrast, the mode of transformation of barbasco, chili peppers, coca, peach palm, and yam falls on the side of the grotesque, and involves a series of immoral beings that had little control over the activities of their lower bodies. This article seeks to discern the Yanesha rationale behind this particular way of classifying plants. It proposes that sublime origin plants are those that were domesticated the earliest and have thus been part of Yanesha culture the longest. In contrast, those domesticated in more recent times –and thus less central to Yanesha cultural life– are attributed a more earthly, grotesque origin.

Key words: *Yanesha, Amazonia, plant classification, plant domestication, indigenous cosmologies*

Al igual que otros pueblos indígenas amazónicos, los Yanesha del oriente peruano conciben las plantas y árboles como seres humanos primordiales que adquirieron su forma actual al final de los tiempos míticos. Los eventos que condujeron a su transformación pueden ser descritos como ''sublimes'' o ''grotescos.'' Entre las plantas cultivadas que experimentaron un modo de transformación sublime se encuentran la yuca –el principal alimento de los Yanesha– así como el maíz, los frejoles, el maní y el algodón. Estas plantas asumieron su forma actual como resultado de la transformación de poderosos demiurgos; una transformación luminosa y contenida que privilegia las capacidades sensuales de la parte superior del cuerpo. En contraste, el modo de transformación del barbasco, el chile, la coca, el pijuayo y el ñame cae dentro de la categoría de lo grotesco e involucra a una serie de seres inmorales que tenían poco control de las actividades de la parte inferior de sus cuerpos. Este artículo busca identificar la lógica Yanesha tras esta forma de clasificar las plantas. Se propone que las plantas de origen sublime son aquellas que se domesticaron más tempranamente y por ello han sido parte de la cultura Yanesha por más tiempo. En contraste, a las plantas domesticadas en tiempos más recientes –y por ello menos centrales a la vida cultura Yanesha– se les atribuye un origen más terrenal y grotesco.

Introduction

In Yanesha cosmology, as in the cosmologies of many other native Amazonian peoples, plants (as well as animals) are thought to have had a previous human existence (Århem 1981:73–74; Chagnon 1968:45; Descola 1996:93). They are said to have acquired their present, vegetative form as the result of the transformation of their primordial human personas shortly before, or shortly after, the present-day Sun ascended to heaven. In a series of myths that

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deal with the end of the time of indifferentiation, a mythical time in which gods, spirits, ogres, animals, plants, objects, and humans lived together on this earth in human form, Yanesha people recount the large-scale transformation of animals and plants. Only a few plants, however, are the subject of mythical narratives recounting their origin in more detail. This paper focuses on ten cultivated plants that stand out in the cosmology of the Yanesha –an Arawak-speaking people living in the eastern slopes of the Peruvian Andes– as the subjects of myths or sacred songs.

A brief recounting of these myths –that I collected with informed consent in Yanesha communities from renowned myth tellers during fieldwork carried out in 1983–1984– reveals that these plants can be grouped into two categories according to the mode of transformation through which they came into being. Following Joanna Overing's (2006) categorization of Piaroa narrative genres, I suggest that the mythical events that led to the appearance of Yanesha plants can be characterized as either ''sublime'' or ''grotesque.'' Plants that underwent a sublime process of transformation include manioc (*Manihot esculenta* L.), maize (*Zea mays* L.), cotton (*Gossypium barbadense* L.), beans (*Phaseolus vulgaris* L.), and peanuts (*Arachis hypogaea* L.). These plants assumed their present form as the result of the transformation of powerful demiurges; a luminous, contained transformation that privileged the sensual capacities of the upper body, especially those attributed to the mouth and the heart. In contrast, the process of transformation of the other five plants –barbasco (*Lonchocarpus utilis* A.C. Sm.), chili pepper (*Capsicum baccatum* L.), coca (*Erythroxylum coca* Lam.), peach palm (*Bactris gasipaes* Kunth), and yam (*Dioscorea trifida* L.f.)– falls on the side of the grotesque. It is related to the baser activities of the lower body. Because of their immoral way of life –expressed in extreme forms of genital, oral, and anal incontinence– these primordial humans were separated from humanity and transformed into the plants they are nowadays.

Since there is plenty of evidence confirming native Amazonians' thorough knowledge of their environment and its resources, I suggest that the distinction between plants of sublime and grotesque origin is in no way random. The aim of this paper is to discern the Yanesha rationale behind this particular way of classifying plants. In order to achieve this objective, I explore a variety of possible criteria of classification, both natural and cultural, and conclude that none of these criteria fits the data. The only criterion that seems to account for the grouping of these particular plants into these two categories is antiquity of domestication. Based on the most recent and reliable archaeological and paleoecological data, I suggest that plants in the sublime origin category are those that were domesticated the earliest and have thus been part of Yanesha culture the longest. In contrast, those domesticated in more recent times –and thus less central to Yanesha cultural life– are attributed a more earthly, grotesque origin. All, however, are crucial to the biological and cultural survival of Yanesha people. They are complementary and are often planted, prepared, or consumed in sublime/grotesque associations. This explains why, regardless of their mode of transformation, they occupy a central place in Yanesha botanical and cosmological lore.

Sublime Transformations

Most of the myths recounting the origin of plants in the sublime category follow a similar schema. Yanesha people experience great suffering as a result of their own fallibility, or because of other reasons. Their ''suffering love'' arouses the ''love/compassion'' of the divinities, who send a divine emissary to help them. The divinities put to the test the generosity of their human creatures to determine if they are worthy of their love. A devote Yanesha passes the test, thus creating the conditions for a greater display of divine generosity. Such display often takes the form of self-sacrifice of the divine emissary, an act which in turn triggers the sublime transformation of the emissary into the present-day plant. A rapid examination of these myths will show the amount of variation in the modalities of sublime transformation within this general schema.

The most important of the sublime origin plants –at least in terms of subsistence– is sweet manioc or ***mam***. Sweet manioc is the basis of Yanesha diet. It is eaten boiled, roasted, or processed in the form of manioc beer (***mamas***). Its centrality in Yanesha subsistence is stressed by the fact that the other name for manioc is ***rrarets***, which is the generic term for food. Thus, from a Yanesha point of view, it can be said that manioc is the food *par excellence*. No meal is complete without the presence of manioc. Its centrality in Yanesha diet is also stressed by its ubiquity in Yanesha gardens. Yanesha know at least 61 varieties of manioc, making it the plant with the most varieties among Yanesha cultivars (Duff-Tripp 1998:407). Being a perennial that can be harvested at any time of the year, manioc is also the most dependable of food crops. So important to Yanesha subsistence is manioc that myth-tellers assert that when the sun god withdrew it from this earth, a period of generalized famine ensued that almost led to the extermination of the Yanesha.

The Origin of Sweet Manioc

In ancient times, Yanesha people used to waste manioc. Angry at their profligacy, ***Yompor Ror***, the solar divinity, withdrew manioc from this earth. People were left with nothing to eat. They were forced to subsist on wild palm hearts and were always very hungry. One day, however, Sun took pity on his suffering human creatures and sent ***Rrarets Pacheñer***, Manioc-Person, to this earth. Manioc-Person arrived in the house of a priestly leader, where he was received by the priest's two daughters. He presented himself under the guise of a dirty and ragged orphan. Since the girls treated him well despite his appearance, he revealed himself as he really was: a handsome young man dressed in a beautiful brown tunic. Manioc-Person told the girls that he had been sent by Sun to provide them with manioc. He then asked them to lash his legs with their brooms. The girls refused, fearful of hurting him. But he insisted until they acquiesced. When they lashed his legs large manioc tubers started falling from them. Manioc-Person told the Yanesha priest to clear a large garden in order to plant manioc. Before leaving to join Sun in his sky house, he taught the girls a song that they should sing when planting manioc in order for it to

produce abundantly. He also warned people not to waste manioc anymore, lest Sun withdraw it again forever.

The myth of the re-appearance of manioc is a morality tale; a tale of transgression, punishment, and redemption. The ancestors of Yanesha people were punished for wasting manioc, the creator god's main gift to his human creatures. By withdrawing their main source of food, the creator condemned the Yanesha to near extermination. The main characteristic of Yanesha divinities, however, is the love/compassion (***muereñets***) they feel for their creatures. This is a kind of love that only the superordinate party in a hierarchical relationship can feel for the subordinate party. It is the love that the divinities feel for their creatures, shamans for their apprentices, or parents for their children. This kind of love/compassion is unfailingly aroused by the suffering love (***a'mueroc̈hteñets***) of those who are in a subordinate position. The term ***a'mueroc̈hteñets*** is a positional term. In relation to those who are in a superordinate position it means ''to suffer out of love and compassion for,'' whereas in relation to those who are in a subordinate position it means ''to suffer for the love and compassion of.'' Yanesha divinities are never indifferent to the suffering love of their creatures. At the sight of their creatures' sufferings, they suffer themselves; an emotion that inevitably leads them to renew their love/compassion for Yanesha people. Feelings of love/compassion and suffering love are a constant in the narratives recounting the appearance of the plants in the sublime origin category.

Yanesha divinities do not dispense their love in an offhand manner, however. Their human creatures must first prove to be worthy of it. This is why the solar divinity sent Manioc-Person as a dirty and poorly dressed orphan. In Yanesha society, orphanhood is the worst possible social status. Not only are orphans deprived of the support and love of their parents, and thus dependent on the good will of often unwelcoming kin, but they are frequently considered to bring ill fortune, and in some extreme cases, they are even thought to be child witches, responsible for their parents' deaths (Santos-Granero 2002, 2004a). For these reasons, orphans are often shunned or kept at a distance. By sending Manioc-Person under the guise of an orphan, the solar divinity intended to test the Yanesha. Only when the priest's daughters offered Manioc-Person food and drink, thus confirming their generous nature, did he reveal himself as the divinity he was. In a society that extols unrestricted generosity and generalized reciprocity (Santos-Granero 1991:44–46), the girls' generous behavior towards Manioc-Person not only redeemed Yanesha peoples' past wastefulness, but it established the conditions for an even greater display of divine generosity. This took the form of an act of self-sacrifice. Manioc-Person asked the girls to lash his legs, a request that at first they were hesitant to comply with, and through this act he brought manioc into existence.

A similar form of self-immolation is found in the narrative recounting the origin of maize. If manioc is the main staple of Yanesha diet, maize, or ***c̈hop***, is the most prestigious crop. Sown in August, at the end of the dry season, maize is harvested in December, at the height of the rainy season (Santos-Granero 2004b:248–249). This is a time when fish and forest animals are thin and difficult to find; a time of hunger and thus, a bad time for babies to be born. The harvest of

maize provides a brief relief during this time of scarcity; brief because Yanesha people do not plant large areas in maize, which requires much coveted but often scarce black soils. Boiled, roasted in hot ashes, turned into gruel, or elaborated into fermented maize beer, maize brings a welcomed change to the monotonous rainy season diet of boiled manioc and chili pepper sauce. The harvest of maize during the rainy season is also an annual reminder of the ancient times of scarcity when maize is said to have appeared.

The Origin of Maize

> In the times when Yanesha people used to experience great calamities, there was a huge storm that destroyed all gardens and killed all cultivated plants. People had nothing to eat. They were starving. ***Yato' Yos***, the creator god, felt pity for his human creatures. He impregnated a virgin girl, so that her child would bring the Yanesha some relief. The girl's father wanted to know who had impregnated her, but the girl refused to tell him who was responsible. When the time came, the girl gave birth to a fair-skinned boy with bright blonde hair. The boy was ***C̈hop Pacheñer***, Maize-Person. Maize-Person saw how much Yanesha people suffered from hunger. Every day they went to work on their gardens, and every day they came back empty-handed. Maize-Person felt sorry for them. One day, he followed his grandfather to his garden without him noticing it. When he arrived, he started walking along the garden, sowing a part of himself on the ground each time he took a step. When he finished sowing the whole garden, he told his grandfather that he was now going to grow very fast. He said that they should harvest him while he was still green and soft. He then taught people how to make mortars out of flat tree buttresses in order to pound maize and turn it into gruel and beer. After instructing the Yanesha on how to grow and process the crop, Maize-Person ascended to the sky, where he and his mortar became bright stars.

Like Manioc, Maize-Person was also sent by a divinity. His appearance also put the Yanesha to the test. The impregnated girl refused to tell who the father of her child was, suggesting that she had a lover, but did not want to reveal his name. Yanesha people are not particularly concerned about virginity, but if a man has impregnated a woman, he has the obligation to come forward and take responsibility for the unborn child. Doing otherwise is a sign of immaturity and unmanliness. Worse still, it is a sign of disrespect for the woman's family. A woman who cannot persuade her lover to take responsibility for the child she is bearing also finds herself in an awkward position. She causes herself and her family to lose face. In a highly egalitarian society where social differences are mostly a matter of degree of personal prestige, losing face is not something to be taken lightly. Although angered by his daughter's actions, the girl's father puts up with both her fatherless pregnancy and her stubborn silence. He even welcomes and raises the new born child who, with his fair skin and yellow hair, betrays his foreign ancestry. It is the man's tolerant behavior that makes him worthy of Maize-Person's generosity. Touched by the people's sufferings, the golden child renounces his earthly life so as to provide the Yanesha with

something to eat. He sows himself bit by bit into his grandfather's garden, thus forsaking his human body until there is nothing left of him, just maize. He then goes to heaven to join his progenitor.

The myth narrating the appearance of cotton, or ***bes***, follows a similar schema, attributing its coming into being to the compassion and the generosity of the creator god (for a variant of this myth see Smith and Bautista Pascual 2006). Cotton is central to Yanesha life. They recognize two main varieties: ***huallamaĩ*** (white) and ***tsamaĩ*** (reddish). Yanesha women use drop spindles to spin raw cotton into very fine thread and backstrap looms to weave fine cotton tunics (***shetamuets***), shoulder bags (***oshaquets***), and wrist bands (***ormets***). Cotton tunics are so important that often, Yanesha people refer to their bodies as their 'tunics.' Cotton is also used in the making of numerous objects, such as bows, arrows, fish nets, and headdresses. It is thus indispensable for Yanesha existence.

The Origin of Cotton

> Long ago, there was a woman who had been abandoned by her husband. She and her children had only bark strips to cover their bodies. One night, the abandoned woman complained out loud about how cold she felt. The creator god felt sorry for the woman and her children and sent ***Yoc̈h Arancom***, Our Sister Spider, to help her. Next day, the abandoned woman found a cotton tunic laying next to her on her sleeping platform. She tried it on and liked how it felt. That same night she complained about how cold her daughter was and pretended to fall asleep. Shortly after, she saw a woman laying a small girl tunic next to her bed. She asked the woman who she was. The woman said she was ***Arancom***, Spider-Woman, and that she had brought them tunics, for she felt pity for their sufferings. The abandoned woman asked Spider-Woman to make tunics for her other children. Spider-Woman agreed to do so, but warned the woman that she should close her eyes while she was making the tunics. The woman could not resist her curiosity and took a peep. She saw Spider-Woman extracting cotton thread from her navel. Spider-Woman felt very ashamed and decided to disappear. Before leaving, however, she taught the woman how to plant and harvest cotton, and how to spin it and weave it. Then she turned into the present-day spider.

The topic of the abandoned woman who has to fend for herself in order to maintain her children is an important leitmotiv in Yanesha mythology (Santos-Granero 1991:229–231). In the myth recounting the origin of cotton, the abandoned woman inspires the love/compassion of the creator god, who witnesses her struggle to raise her children on her own. Unfortunately, the abandoned woman is too curious, and her curiosity leads her to see Spider-Woman naked, extracting cotton thread from her belly. One of the greatest taboos in Yanesha society is the display of one's genitals after undergoing puberty. Not even among members of the same sex is it considered appropriate to show one's genitals. When a group of men bathe in the river, they are very careful to always keep their genitals out of sight of their companions, either by turning their backs to them, or by covering their genitals with their hands. I understand that the

same is true among women. The abandoned woman broke this taboo by seeing Spider-Woman naked, although not intentionally. Ashamed because she was seen naked, and because her secret was discovered, Spider-Woman decides to transform herself, not before granting the abandoned woman the knowledge of cotton spinning and weaving. Spider-Woman's modesty, as we shall see, is in stark contrast with the impudent behavior of the primordial beings who gave life to the plants in the grotesque origin category.

Although I have not been able to collect the myths narrating the appearance of ***choch*** or beans (*Phaseolus vulgaris*), and ***chech***, or peanuts (*Arachis hypogaea*), I have good reasons to believe that their origin was also sublime. Both plants are listed among the minor divinities of the Yanesha pantheon where they are known as ***Yoc̈h Choch***, Our Sister Bean, and ***Yoc̈h Chech***, Our Sister Peanut. Not all plants with divine status are attributed a sublime origin, coca being the most outstanding example. Most, however, are. In addition, in the origin myth of yam, which I discuss below, 2 of the 18 varieties of beans recognized by the Yanesha (Duff-Tripp 1998:409) appear as discreet and judicious plants that know how to keep a secret in contrast with the half-witted yam who cannot stop blabbering. More importantly in arguing the case that beans and peanuts belong to the sublime origin category is the fact that, like manioc and maize and unlike all grotesque origin plants, these two plants are also the subject of important sacred ***coshañ̃ñats*** songs (Smith 1977:Appendix 1). The songs of manioc and maize, known as ***Rrartsorec̈h*** and ***C̈hopahueresharec̈h***, belong to the ***conareñets*** male drum music style. Those of beans and peanuts –***Chochrec̈h*** and ***Chechrec̈h***– belong to the ***sherareñets*** female vocal style. All are thought to induce an abundant production of the plants in whose honor they are sung. For these reasons, and until proven otherwise, I suggest that beans and peanuts are sublime origin plants.

In brief, all sublime origin plants were given to the Yanesha by the higher divinities, or by powerful mythical beings, out of love/compassion for their sufferings. Theirs was an act of divine generosity involving powerful spoken and sung words; words that spring from the heart –the seat of thought and knowledge– and that, by being uttered, have the power to transform reality. In Yanesha ontology, creation is inextricably linked to the divinities' vital breath and the act of naming. The creator god and his evil classificatory brother created all the good and evil things that exist today by insufflating their life-giving breath into figures made out of clay and at the same time naming them. In fact, in Yanesha thought, naming and insufflating vital breath seem to be equivalent acts. To name and to give life is one and the same process. Powerful words, however, do not always respond to good thoughts, or to good intentions. As we shall see, some of the plants accorded a grotesque origin were also brought into existence by the power of words, in their case, the words of immoral, or amoral, mythical beings.

Grotesque Transformations

The origin myths of plants in the grotesque category also follow a common schema. The main character is always an immoral or amoral mythical being, expressed in its selfishness and lack of generosity and manifested in its oral,

genital, or anal incontinence. The immoral actions of these beings make the people around them suffer. In the end, they are punished for their actions, their violent deaths leading to their transformation into the present-day, namesake plants. Often, however, the mythical beings that gave rise to these plants redeemed themselves through a last-minute act of generosity, which allowed for their self-transformation. This is why plants in this category are also conceived of as gifts from supernatural beings and thus, as important elements in Yanesha subsistence. Their mode of origin might have been grotesque, but they are not grotesque plants.

The most important among the grotesque origin plants is, without doubt, coca, or ***coc***. Coca is a constant presence in Yanesha daily life despite the strong pressures from both Evangelicals and Seventh-day Adventists to eradicate it. Coca chewing not only provides the necessary strength to undertake heavy tasks such as clearing the forest, weeding gardens, building a house, or walking long distances, but it is also considered to be indispensable to divine the outcome of key activities such as hunting, fishing, setting up a loom, traveling, or choosing the site for a new house or garden. All adults, regardless of gender, know how to divine with coca leaves. Some are better interpreters of coca's omens than others, but with the exception of the most radical Christian converts, most Yanesha resort to coca to have a glimpse of the past and the future. Coca is particularly important in shamanic practices, where it is used to divine the cause of a patient's illness. Unlike tobacco, whose mystical jaguars can be used by shamans to fight the human and non-human sorcerers that cause disease, coca does not have an important role in curing sessions. Although shamanic healers need coca to identify the causes of disease, coca's omens cannot always be trusted. As we shall see below, like the primordial being from which it originated, coca is deceitful.

The Origin of Coca

One day, while ***Yompor Ror***, the solar divinity, was building a fish trap in the river, he got tired. He asked his brother, ***Yompor Huar***, to go to his house and ask ***Ror's*** wife, ***Yachor Coc***, for a little coca. ***Yompor Huar*** went to his brother's house and told ***Yachor Coc*** that Sun had sent him to fetch some coca. ***Yachor Coc***, who wanted to seduce her brother-in-law, said that she could not help him, for in order to make coca appear, she had to have sexual relations with her husband. That is how she persuaded ***Yompor Huar*** to make love to her. While having sex, coca started pouring out from ***Yachor Coc's*** vagina. When a small amount of dried coca leaves had been produced, ***Yachor Coc*** told ***Huar*** to let go of her. But he continued copulating until a large amount of green coca leaves appeared. When ***Yompor Huar*** was having sex with ***Yachor Coc***, ***Oshecllell***, the gossipy little bird that likes to nest in Yanesha houses, saw them. He immediately told ***Yompor Ror*** what he had seen. Sun became extremely angry. When he arrived home, he started beating his wife. He then cut her into pieces and dispersed her body parts all over the place. From the bloodied remains of ***Yachor Coc*** sprouted the present-day coca plants.

Yachor Coc's infidelity drove her husband crazy. In a violent bout of jealousy, the solar divinity beat his wife and tore her body into pieces. Another version of this myth says that every time that Sun ripped a member from his wife's body, the torn limb turned into a person, making him even more furious. In the end, Sun managed to tear his wife's body into little pieces from which coca bushes sprouted. ***Yompor Ror*** is known for his sudden bursts of fury and his homicidal bouts, but such violent moods are always compensated by acts of love and caring. True, coca originated from the members he ripped from his unfaithful wife, but it also originated from the god's desire to benefit his creatures. Myth-tellers are careful to stress that transforming his wife into coca bushes was not a random act, but one of divine generosity. ***Yompor Ror*** wanted Yanesha people to have something that would give them strength to work and that would allow them to divine what was making them ill. As we shall see, even the most grotesque of the monstrous mythical beings who gave life to the plants in this category were capable of such acts of generosity. This is certainly the case of ***Hua'ẽna'***, the horny, cannibalistic ogre who gave origin to barbasco (***coñape'***) and chili peppers (***ẽots***).

The Origin of Barbasco and Chili Peppers

> ***Hua'ẽna'*** was a gigantic forest ogre endowed with an extremely long penis armed with teeth, which he carried wrapped around his waist. Whenever he saw a pretty woman, he unwrapped his *penis dentata* and raped and ate her. One day, ***Hua'ẽna'*** went to fish at night. Since the fish would not bite, he became furious. He unwrapped his penis and started beating it on the river stones. Soon after, he ejaculated. As his semen started flowing downriver, fish started popping up on the river's surface. When ***Hua'ẽna'*** saw the fish floating he said: ''So you didn't want to bite, eh? But now you show up, eh? Well, then, now you shall die.'' From then onwards whenever he wanted to fish ***Hua'ẽna'*** beat his penis on the river stones. He did not, however, allow the Yanesha to collect the fish he had killed by this means. If they tried to gather the poisoned fish, ***Hua'ẽna'*** ate the transgressors, or tore out their eyes. One day, however, when the forest ogre was very old, Yanesha people saw how it was that he poisoned the fish. ***Hua'ẽna'*** became ashamed and decided to disappear. Before disappearing, he cut off a piece of his penis and buried it in his garden. This is how barbasco originated. In turn, ***Hua'ẽna's*** farts gave origin to ***hua'ẽeẽots***, one of the hottest varieties of chili peppers.

In contrast to the more dramatic tone of the myth of ***Yachor Coc***, the myth of ***Hua'ẽna'***, with its slapstick humor, makes everybody laugh. The ogre's antics are especially celebrated by children, who cannot stop giggling at the image of ***Hua'ẽna'*** beating his giant penis on the river stones in a frenzy of fury and masochistic madness. ***Hua'ẽna'*** is grotesque in all respects. He has a giant penis which he can only carry around by wrapping it around his waist. He is a horny ogre, aroused by every woman that crosses his path. At the same time, however, his *penis dentata* cannot help eating the women he desires as he rapes them. As a

result, his sexual appetite can never be fulfilled, and he can never reproduce. Even if he could stop eating the women he raped, it is not clear whether ***Hua'ẽna'*** would be able to have children, for his semen is poisonous. It kills fish. In Yanesha society, childlessness is seen as a curse. Given that having and raising children is the ultimate proof of maturity and adulthood in Yanesha society, childless persons are considered not fully adult and are thus treated as children. This is one of the reasons why ***Hua'ẽna'*** is such a comic figure. Despite his humongous genitals and his intense sexual activity he has no issue. He behaves as a spoiled child; a child that throws terrible temper tantrums whenever he can't obtain what he wants.

Hua'ẽna' is not only a horny, cannibalistic rapist, he is also selfish and ungenerous. He refuses to share his catch with the Yanesha, and eats or blinds all those who attempt to steal fish from him. In Yanesha mythology, however, even lascivious and murderous figures like ***Hua'ẽna'*** are endowed with a redeeming facet. Before disappearing, ashamed because the secret of his success in fishing had been discovered, ***Hua'ẽna'*** decides to cut off his penis and plant it, thus bringing barbasco into existence. He then transforms his farts into chili peppers. These acts partially redeem him. After a life of sexual disorder, cannibalism and selfishness, ***Hua'ẽna'*** finally shows a hint of generosity by leaving barbasco and chili peppers as a gift for humanity. The myth of origin of peach palm, or ***poporr***, is structured upon a similar schema.

The Origin of Peach Palm

> Long ago, there was a gigantic evil divinity called ***Ayots***, whose son, ***Poporrona'***, or Peach Palm-Person, looked like a child but was already an adult. He just refused to grow up. His father carried him on his shoulders wherever they went. The child was a chatterbox. He constantly asked ***Ayots*** who the people they crossed on their way were. Irritated by his unceasing interrogation, ***Ayots*** answered that they were this or that animal. But since he was a divinity, by so doing he turned people into animals. One day, ***Ayots*** transformed his sister's children into monkeys and pacas. In revenge, his sister and brother-in-law buried him in a large hole. They then adopted the orphan ***Poporrona'***. But the child had the same transformative powers as his father, and one day he turned his baby cousin into a rotten piece of wood. After doing this he ran away and dammed a river to kill people and eat them as grubs. A group of men chased him to kill him, but since he had extraordinary powers, they ended up killing themselves. When there were only two men left, ***Poporrona'*** took pity on them. He told them to build a seat out of balsa wood and to nail him to it thrusting a large ***chonta*** spike through his head and body. He then told them to come back ten days later. When the men came back to see him, they found instead a tall peach palm heavy with fruit. Shortly after, Vulture-Person wiped his arse after defecating on the new peach palm, an act that resulted in the palm growing sharp thorns.

In this myth Peach Palm-Person is attributed the traits of a child sorcerer. He is not what he looks to be, an innocent child carried on his father's shoulders, but

an evil grown-up who purposefully urges his father to use his transformative powers to turn people into animals. He is so evil that he does not hesitate to incite his father to transform his own nephews into howler monkeys and pacas. After his father's death, he uses his powers to transform his baby cousin into a rotten piece of wood. In addition, he likes to eat people as if they were tasty grubs. ***Poporrona'*** is a grotesque *faux* child, who hides his malevolence behind his father's acts. He refuses to grow up and acts as a reckless, self-centered child, much like the childless ***Hua'ẽna'***. Like ***Hua'ẽna'***, however, ***Poporrona'*** takes pity on his chasers and before they kill each other, he surrenders his mystical powers. This capacity, known by the term ***a'rroyañets***, is exclusive to powerful mythical or supernatural beings, who sometimes surrender their power as a sign of love for a third party. ***Poporrona'*** not only renounces his powers, but instructs his pursuers as to how they should kill him. Like that of all the other primordial beings who gave origin to grotesque plants, his death is extremely violent: impalement with a stake made of ***chonta*** wood, the hard-as-iron black wood of the peach palm tree. The grotesqueness of ***Poporrona's*** life does not end, however, with his death. Adding insult to injury, the dirty Vulture-Person wipes his bottom on the trunk of the peach palm, forcing it to grow thorns.

Punishment, but for a very different kind of grotesque behavior, is also found in the origin myth of yam, or ***c̈ho***, which forms part of a longer myth recounting the appearance of harmonious social relations (see Smith 1977:Appendix 2).

The Origin of Yam

> In old times, there was a woman whose husband disappeared. She did not know it, but he had been murdered. The woman was very sad. When a ***To'to'*** bird landed near her, she said out loud how much she would like to see her husband. The bird turned into a human being and carried her and her children to the land of the ''murdered ones'' (***sanrronesha'***). There the woman found her husband covered with maggots, drinking fermented heart, liver, and kidney drink –the beverages normally drunk by the murdered ones. The man invited his wife and children to drink with him. Horrified by her husband's aspect and afraid of what would happen to them if they accepted the invitation, the woman asked the ***Huacañcho'ch*** bird to hide her and her children. The murdered man went searching for his wife. Since he could not find her, he came down to this earth. He asked each of his wife's garden plants whether they had seen her. Bean (***cocach***), String Bean (***arbesh***) and Taro (***llot***) said that they had not seen their mother for a long time. Yam, who was slow-witted, told him the truth. But since Yam could not speak well, what he said made no sense to the man. Furious with Yam because he could not speak more clearly, the man hit him on the head with a stick, turning him into the plant that bears his name nowadays.

Yam's behavior, though not entirely his fault, put the hiding woman's life in danger. Incapable of keeping a secret, Yam revealed to the murdered man where his wife was. Fortunately for the woman, Yam's mental handicap did not allow him to speak properly. Thus, the murdered man could not understand his words.

If he had understood Yam, he would have found his wife and children, and by forcing them to share his food and drink, he would have turned them into murdered people like himself (for the importance of commensality in inducing bodily transformations see Gow 2007; Santos-Granero 2009b; Vilaça 2007). Yam is a guilty innocent; a person whose oral incontinence does not derive from wickedness but from mental incapacity.

Yam is not, however, the only incontinent character. All the mythical characters who gave life to the plants in the grotesque origin category display some kind of incontinence. Peach Palm-Person and Yam suffered from oral incontinence. They could not stop talking. Peach Palm-Person questioned his father relentlessly out of malice, so as to make him angry and trigger his evil transformative powers. Yam could not control what he said out of a mental incapacity that prevented him from lying. Their oral incontinence was extremely dangerous insofar as it led, or could have led, to the death or transformation of innocent people. ***Yachor Coc*** and ***Hua'ẽna'*** suffered from sexual incontinence. They could not resist their sexual urges: ***Yachor Coc*** out of a moral flaw that prevented her from being faithful; ***Hua'ẽna'*** out of a monstrous bodily appetite for violent sex and cannibalistic meals. ***Hua'ẽna's*** sexual incontinence was also expressed in his frantic and violent masturbation, which was exacerbated once he found his semen could poison fish. In addition, he suffered from anal incontinence, an inability to retain the poisonous gases that affected those living near him and that at the end of his life were transformed into chili peppers.

These forms of incontinence are always sure to arouse laughter among the audience, being viewed as the hilarious antics of powerful but grotesque mythical beings. In everyday social interaction, however, they are strongly disapproved of, since they are perceived as signs of immorality or, worse still, as an indication of sorcerous intentions. All forms of bodily incontinence are potentially harmful, either for individuals or for society as a whole. Sexual incontinence, whether leading to consensual extramarital affairs or to rape, always ends in the breakup of marriages, families, and local social networks. Sexually promiscuous men or women are thus considered to be highly disruptive. Anal incontinence, particularly farting, can be the subject of much bantering when it takes place between children or adolescents. When it involves adults, however, it becomes a much more serious matter, since the potent odor of the farts of particularly powerful people –shamans and old people, for example– are thought to produce illness and death in weaker persons, namely children and ill people. Myths remind audiences about the inappropriateness of bodily incontinence by stressing its fatal consequences, including the gory death of their protagonists. In Yanesha mythology, as I hope to have shown, immorality rarely goes unpunished.

Classificatory Principles

Native Amazonian peoples are renowned for their deep knowledge about their environments. They have detailed knowledge about seasonal changes (Gragson 1992; Posey 1983; Sponsel 1986), the movement of stars and planets (Santos-Granero 1992; Wilbert 1986), the behavior of terrestrial animals, birds and

fish (Chernela 1985; Moran 1991; Reichel-Dolmatoff 1978), the flowering and fruiting cycles of wild trees (Carneiro 1978; Irvine 1989; Pohle and Reinhardt 2004), the potential of different soils (Balée 1989; Hecht 1990; Salick 1989), the agricultural needs of a large variety of cultivars (Descola 1996; Johnson 1983), and the regeneration of fallow lands (Denevan et al. 1984; Huanca 1999). Native Amazonian taxonomies are thorough and complex; they include hundreds of different species of animals and plants (Berlin and Berlin 1977; Shepard 1997). This suggested to me that the distinction between plants of sublime and grotesque origin found in Yanesha mythology could not be arbitrary; that there must be a rationale behind the grouping of cultivated plants in one category or the other.

For this reason, I first looked at the natural properties of the plants in each category and selected those traits that seemed to be most relevant to Yanesha people. Type of plant (perennial or seasonal), mode of propagation, soil requirements, and time of planting and harvesting are factors constantly referred to by Yanesha farmers. People will say, for instance, that manioc requires red soils to grow well, that it reproduces through cuttings, that it can be planted throughout the year, and that it can be harvested for more than one season. In addition, although toxicity is not a trait that Yanesha people would normally consider to categorize plants, they often mention it in relation to some of the plants in the sample, such as chili peppers or barbasco, so I added it as a fifth feature (Table 1).

The first criterion (type of plant) showed that there was a greater incidence of annual plants in the sublime origin category. Four out of the five plants in this category are annuals. Cotton, however, is a perennial, whereas beans and manioc are annuals that can act as perennials. In contrast, all plants in the grotesque origin category are perennial. Two, however, chili peppers and yam, can also act as annuals. Thus, it is clear that this criterion cannot account for this particular classification.

The second criterion (mode of propagation) was also inconclusive. Among the sublime origin plants, beans, cotton, maize and peanuts are propagated through seeds, whereas manioc is reproduced through cuttings. In contrast, among the grotesque origin plants, three depend on vegetative propagation – barbasco (cuttings), peach palm (shoots), and yam (tuber pieces)– whereas two depend on reproductive propagation: coca and chili peppers.

The criterion of soil requirements was equally inconclusive, insofar as there is almost an equal number of plants requiring black and red soils in each category. In the sublime origin category beans, maize, and peanuts require black fertile soils to produce abundantly, whereas cotton and manioc can thrive in red clayey soils. In the grotesque origin category, barbasco, chili peppers, and yams seem to require black soils to grow well. Coca and peach palm, however, can develop well in poorer soils.

The fourth criterion (time of planting) did not produce clear cut results. Sublime origin plants are equally divided between those that are planted seasonally (beans, maize, and peanuts) and those that can be planted throughout the year (cotton and manioc). In contrast, most grotesque origin plants can be planted throughout the year, with the exception of chili peppers, which are planted only during the dry season.

Table 1. Yanesha plant classification according to natural and cultural traits.

	SUBLIME ORIGIN PLANTS					GROTESQUE ORIGIN PLANTS				
	Beans	Cotton	Maize	Manioc	Peanut	Barbasco	Chili	Coca	Peach-palm	Yam
NATURAL TRAITS										
Type of plant										
Annual	X		X	X	X		X			X
Perennial	X	X		X		X	X	X	X	X
Mode of propagation										
Reproductive	X	X	X		X		X	X		
Vegetative				X		X			X	X
Soil requirements										
Black soils	X		X		X	X	X			X
Red soils		X		X				X	X	
Time of planting										
Seasonally	X		X		X		X			
Throughout the year		X		X		X		X	X	X
Toxicity										
Toxic	X					X	X			X
Non-toxic		X	X	X	X			X	X	
CULTURAL TRAITS										
Main uses										
Food	X		X	X	X		X		X	X
Other		X				X		X		
Gender associations										
Sown by women			X	X	X				X	X
Sown by men	X	X	X	X		X	X	X		
Gender associations										
Harvested by women	X	X	X	X	X	X		X		X
Harvested by men			X			X	X		X	
Degree of domestication										
Domesticated	X	X	X	X	X		X	X	X	X
Semi-domesticated						X				

The last criterion (degree of toxicity) produced equally mixed results. Most plants in the sublime origin category are not toxic. Raw or undercooked beans, however, can be very toxic because they contain lectin, a type of protein that possesses insecticide qualities (Dhurandhar and Chang 1990). Lectins are found in many types of beans, but they are present in especially high concentrations in *Phaseolus vulgaris*. This protein hinders gastrointestinal tract cells from repairing tears produced by digestion, thus provoking nausea, diarrhea and vomiting. To destroy lectins, beans must be cooked at temperatures higher than 80°C.

In contrast, three out of the five plants in the grotesque origin category are highly toxic. This is especially true of barbasco, which contains rotenone, an odorless toxin that has broad-spectrum insecticide, piscicide, and pesticide properties (Van Andel 2000). The highest concentrations of rotenone are found in the plants' roots. This toxin is lethal to fish because it enters directly into their blood stream through their gills. Consumption of fish caught in this way is not, however, harmful to humans, because rotenone is very poorly absorbed by the gastrointestinal tract. In larger quantities, however, it can be lethal. Some Yanesha women have been known to commit suicide by ingesting concentrated concoctions of barbasco. Although less so, chili peppers and yams can also be toxic. The main toxin in chili peppers is capsaicin (Purseglove 1968). Even in small amounts, this toxin causes a hot, burning sensation in any tissue or mucous membrane with which it comes into contact. Extended exposure may cause ulcers on the skin and membranes, as well as irritation to the eyes. If ingested in large amounts by adults or small amounts by children, capsaicin can produce nausea, vomiting, abdominal pain, and burning diarrhea. In turn, yam contains a distasteful alkaloid known as dioscorine, which acts as a depressant of the nervous system (Coursey 1967). When ingested, it may produce shortness of breath, dizziness, and manifestations similar to drunkenness. Dioscorine can be removed by soaking the tuber in water or cooking it. The tubers of wild yams are more toxic than those of the cultivated varieties; in some regions of the world wild yam is used as fish poison. Finally, although *Erythroxylon coca* contains cocaine, an alkaloid that together with a number of other compounds acts synergistically to produce a sense of wellness and endurance in those who chew coca leaves, the amount contained in average leaves is minute and is not considered toxic.

In view of the fact that the sublime/grotesque classification did not seem to respond to differences in the natural properties of the plants in the sample, I decided to explore possible cultural differences. I concentrated on four criteria: 1. main use: whether the plants are used as food or for other purposes; 2. gender division in sowing; 3. gender division in harvesting; and 4. degree of domestication: whether they are domesticated or semi-domesticated (Table 1). The first three traits appear recurrently in Yanesha conversations about plants. People distinguish between those plants that are edible and those that are used for other purposes. In addition, they are very vocal about the taboos that prescribe whether men or women should plant or harvest a particular plant in order for it to produce in abundance, and they are very careful to comply with these taboos. I added degree of domestication because I knew that barbasco was considered to be a semi-domesticated plant and –since I am not a botanist– wondered about the status of the other plants in the sample.

The first of these criteria (main use) did not produce a clear-cut division. True that the main staples of Yanesha subsistence –manioc, maize, beans and peanuts– are found in the sublime origin category, but one of the plants in this group –cotton– is not used as food. In contrast, although some of the most important non-edible plants –coca and barbasco– are found in the grotesque origin category, so are three edible plants –chili peppers, peach palm, and yams. Although less important for Yanesha subsistence, these three plants are nonetheless very much appreciated for providing greater variety to Yanesha diet. This is particularly true of chili peppers, which are basic to ''accompany'' manioc in times of meat scarcity. So important are they as a substitute for meat that the other name for chili peppers is ***ech***, or 'meat.'

The criterion of gender division of labor with regards to sowing also proved to be irrelevant. Two of the sublime origin plants (beans and cotton) are thought to produce abundantly only if planted by men. In contrast, peanuts produce better if planted by women, whereas manioc and maize can be planted by either men or women. Among grotesque origin plants the situation is similar. Coca, barbasco, and chili peppers should be ideally planted by men, whereas yams and peach palm must be sown by women.

We find the same heterogeneity with respect to gender divisions in harvesting. Among the sublime origin plants, cotton, beans, and manioc should be harvested only by women, whereas maize can be harvested by both women and men, and peanuts by both women and children. Among grotesque origin plants, coca should be harvested by women, and yams by young girls. Peach palm, however, should be harvested by men. So should chili peppers, which are preferably harvested at noon, so that they will be even more pungent. In contrast, the roots of barbasco can be collected by both men and women.

Equally unconvincing was the criterion of degree of domestication. With the exception perhaps of barbasco, which some authors contend was still not fully domesticated at the time of contact (Clement 1999), all plants in the sample show signs of having been domesticated a long time ago. Domestication, as defined by Pickersgill (2007:925), is a process by which human selection and manipulation of wild plants lead to the development of morphological and genetic differences distinguishing the domesticated species from their wild progenitors. A crucial factor defining what is known as the ''domestication syndrome'' is the domesticated plants' increasing dependency on human intervention for growth and reproduction. According to Pickersgill (2007:925), ''Features of the domestication syndrome include loss of dispersal, increase in size (especially of the harvested part of the plant), loss of seed dormancy, and loss of chemical or mechanical protection against herbivores.'' Increase in size of the harvested part of the plant is present in almost all of the plants in the sample. Loss of dispersal capacity is particularly evident in manioc and maize, which require human intervention to propagate, either through cuttings or to liberate the seeds from their casing. Other plants were selected not only to increase the size of its harvestable part but also to enhance particular traits, such as a higher degree of pungency in chili peppers or a higher rate of rotenone in barbasco. In contrast, other plants were manipulated to lose an unwanted trait, such as the thorns of the peach palm or the toxicity of yams.

Given that, with the exception of barbasco, all plants in the sample were undoubtedly domesticated at the time of contact with Europeans, it occurred to me that the criterion which might account for the sublime/grotesque classification was not the degree of domestication, but rather antiquity of domestication. In order to test this variable, I consulted the four most recent works on the origins of agriculture in tropical America, specifically Pearsall (1992), Piperno and Pearsall (1998), Iriarte (2007), and Pickersgill (2007). These works provide either the dates of domestication or, more commonly, the earliest dates for which there is evidence that a given plant had been domesticated and was being cultivated, which these authors often use as a proxy for date of domestication. Since these general works do not provide information on all of the plants of my sample, and since advances in dating and plant identification methods are rapidly pushing back the dates of domestication of many American cultivars, I also browsed the literature in search of the most recent information on the dates of domestication or time when a particular domesticated plant first appears in the archaeological record of each of the plants in my sample.

The results of this inquiry can be seen in Table 2. The date ranges for sublime and grotesque origin plants derived from the more general works show much overlap and are thus inconclusive. It should be noted, however, that this is mostly due, first, to the fact that these works provide broad date ranges rather than specific dates for the domestication of these plants and, second, to the fact that they provide information for only part –sometimes as little as half– of the plants in the sample. In contrast, the dates provided by the most recent works on this topic substantiate my hypothesis, showing that sublime origin plants were domesticated much earlier than those in the grotesque origin category and that the boundary between the two types of plants is set at around 5,500 B.P. Future research could change these dates and, thus, the validity of my conclusions. However, if my estimations about probable dates of domestication for these plants, as calculated on the basis of the differential rates of diffusion of maize, are right (Table 3), then the results obtained continue to confirm my hypothesis.

There are two caveats to this neat divide. In a recent article, Perry et al. (2007) report finding starch grains of *Capsicum* spp. in milling stones excavated in the sites of Loma Alta and Real Alto, located in southwestern Ecuador, which they dated to 6,100 B.P. This would push back the date of domestication of *Capsicum* reported by Clement et al. (2010) by around 2,000 years, introducing some overlap between the domestication dates of sublime origin plants (8,700-5,500 B.P.) and those of grotesque origin plants (from 6,100 to about 500 B.P.). However, since Perry et al. (2007) were not able to identify the starch grains they found to the species level, we do not know for sure whether the remains belong to *C. baccatum* or to other species. For this reason, I have opted to keep 4,000 B.P. as the earliest date for the domestication of *C. baccatum*. However, even if the remains found by Perry et al. correspond to *C. baccatum*, which is probably the case, this would not substantially affect my hypothesis since the overlap is minimal. The second caveat is more serious. Until recently, the earliest date for the domestication of coca was that provided by Bonavia et al. (1993), who, on the basis of excavations carried out in the Huarmey Valley, suggested that coca was being cultivated on the Peruvian central coast as early as 4,500 B.P. More recently,

Table 2. Plant classification by antiquity of domestication.

	Antiquity of earliest remains				
Plants by mode of origin	Pearsall 1992[1]	Piperno and Pearsall 1998[1]	Iriarte 2007[1]	Pickersgill 2007	Various
Sublime origin					
Maize (*Zea mays*)	7,250 BP	6,000 BP	6,850 BP	6,000 BP	8,700 BP (a)
Peanut (*Arachis hypogaea*)	4,450 BP	5,700 BP		7,000 BP	7,840 BP (b)
Bean (*Phaseolus vulgaris*)	9,750 BP	3,700 BP	4,337 BP	4,000 BP	7,700 BP (c)
Manioc (*Manihot esculenta*)	10,000 BP	6,000 BP	7,500 BP	6,000 BP	7,000 BP (d)
Cotton (*Gossypium barbadense*)	5,350 BP	6,350 BP	4,000 BP	6,000 BP	5,500 BP (e)
Grotesque Origin					
Yam (*Dioscorea trifida*)		6,000 BP	6,000 BP		5,500 BP (f)
Coca (*Erythroxylum coca*)	5,750 BP	5,700 BP		3,000 BP	4,500 BP (g)
Chili Pepper (*Capsicum baccatum*)	4,650 BP	3,700 BP		5,000 BP	4,000 BP (h)
Peach palm (*Bactris gasipaes*)					2,300 BP (i)
Barbasco (*Lonchocarpus utilis*)					<500 BP (j)
Date of domestication ranges					
Sublime origin plants	10,000-4,450 BP	6,350-3,700 BP	7,500-4,000 BP	7,000-4,000 BP	8,700-5,500 BP
Grotesque origin plants	5,750-4,650 BP	6,000-3,700 BP	6,000-6,000 BP	5,000-3,000 BP	5,500-<500 BP

[1]These authors provide date ranges for the domestication of the plants they discuss; for comparative purposes, here I register only the mean date of domestication.

Sources:

[(a)]Piperno et al. 2009: date based on phytolith and starch grain analysis performed on 21 ground stones and 5 chipped stone tools found in the Xihuatoxtla shelter, Balsas Valley, Mexico.

[(b)]Dillehay et al. 2007: date based on macrobotanical remains found in sealed house floors and hearths found in Ñanchoc Valley, western slopes of the Peruvian northern Andes.

[(c)]Kaplan 1973; Kaplan and Lynch 1999: based on radiocarbon dates on charcoal associated with *Phaseolus vulgaris* in Guitarrero Cave, Ancash, northern Peruvian Andes.

[(d)]Piperno et al. 2000: date based on starch grains found in a stone tool excavated in site Ag-13, Aguadulce, Pacific coastal plain of Central Panama.

[(e)]Dillehay et al. 2007: date based on macrobotanical remains found in sealed house floors and hearths found in Ñanchoc Valley, western slopes of the Peruvian northern Andes.

[(f)]Scheel-Ybert 2001: date based on charcoal fragments found in Sambaqui do Forte, a shell midden located close to Cabo Frio, eastern Brazil.

[(g)]Bonavia et al. 1993: date based on leaf fragments found in site PV 35-6, Huarmey Valley, Peruvian central coast.

[(h)]Clement et al. 2010: date based on macrobotanical remains found in Huaca Prieta and Punta Grande, Peruvian northern Coast.

[(i)]Corrales Ulloa and Mora Urpi 1990: date based on carbonized endocarps found in Quebrada Seca, western lowlands of Costa Rica.

[(j)]Clement 1999: Appendix 2: the author asserts that by 1492 *Lonchocarpus utilis* was still a semi-domesticated species.

Table 3. Estimated date of arrival of domesticated plants among the proto-Arawak.

Plant by mode of origin	Region of domestication	Site of earliest remains (ER)	Antiquity of ER	Estimated date of domestication	Arrival among proto-Arawak
Sublime origin					
Maize	Balsas Valley, Mexico[1]	Balsas Valley, Mexico	8,700 BP	8,700 BP (a)	6,400 BP (a)
Peanut	Mato Grosso, Brazil[2]	Ñanchoc Valley, Peru	7,840 BP	9,900 BP (b)	8,400 BP (b)
Bean	West-central Mexico[3]	Guitarrero Cave, Peru	7,700 BP	11,900 BP (c)	8,700 BP (c)
Manioc	Rondonia/Acre, Brazil[4]	Aguadulce, Panama	7,000 BP	9,200 BP (d)	8,300 BP (d)
Cotton	Border Peru/Ecuador[5]	Ñanchoc Valley, Peru	5,500 BP	6,000 BP (e)	4,800 BP (e)
Grotesque origin					
Yam	Border Brazil/Guyana[6]	Sambaqui do Forte, Brazil	5,500 BP	7,500 BP (f)	6,500 BP (f)
Coca	Eastern Peru[7]	Huarmey Valley, Peru	4,500 BP	5,000 BP (g)	4,100 BP (g)
Chili peppers	Eastern Bolivia[8]	Huaca Prieta, Peru	4,000 BP	5,700 BP (h)	4,200 BP (h)
Peach palm	Rondonia/Acre, Brazil[9]	Quebrada Seca, Costa Rica	2,300 BP	4,600 BP (i)	3,700 BP (i)
Barbasco	Undomesticated[10]		<500 BP	<500	
Date of arrival ranges					
Sublime origin plants					8,700-4,800 BP
Grotesque origin plants					6,500-3,700 BP

Sources:
[1]Pearsall 1992; Pickersgill 2007:4; Piperno and Pearsall 1998:163.
[2]Piperno and Pearsall 1998:130.
[3]Piperno and Pearsall 1998:136: these authors assert *Phaseolus* was domesticated independently in Mesoamerica and the Andes but that the varieties found in lowland South America are closer to the Mesoamerican varieties.
[4]Pickersgill 2007:5; Rival and McKey 2008.
[5]Pearsall 1992; Pickersgill 2007:5; Piperno and Pearsall 1998:150.
[6]Piperno and Pearsall 1998:117.
[7]Pearsall 1992: 193; Pickersgill 2007:5.
[8]Pearsall 1992; Pickersgill 2007:5; Piperno and Pearsall 1998:153.
[9]Clement 1988; Clement et al. 2010:83; Piperno and Pearsall 1998:158; but Morcote-Rios and Bernal (2001) propose that the place of domestication was eastern Colombia.
[10]Clement 1999:Appendix 2.
Notes:
[(a)]We know that maize was domesticated around 8,700 BP and that it took 1,700 years to diffuse from west-central Mexico to central Panama. If we calculate the distance from central Panama to eastern Colombia (900 km) and from eastern Colombia to San Carlos (800 km) and we apply a slow diffusion rate to the first tract and a faster rate to the second tract, we can estimate the time it took maize to travel from west-central Mexico to San Carlos as 2,300 years. This means that it could have reached the proto-Arawak around 6,400 BP.
[(b)]If we accept that peanut was domesticated in Mato Grosso, but it's earliest remains were found in Ñanchoc Valley and dated 7,840 BP, this means that it was domesticated earlier. If we consider the distances between Mato Grasso to eastern Peru (2,400 km), and from eastern Peru Ñanchoc Valley (450 km), and apply a fast diffusion rate to the first tract and slower

Table 3. Continued.

rate for the second, this gives us 2,100 years, which would place the domestication of peanut around 9,900 BP. If we then consider the distance from Mato Grosso to San Carlos (2,300 km) and apply the fast rate of diffusion, this gives us a total of 1,500 years, suggesting that peanut reached the proto-Arawak sometime around 8,400 BP.

[c]If we accept that bean was domesticated in west-central Mexico, but it's earliest remains were found in Guitarrero Cave and dated 7,700 BP, this means it was domesticated at an earlier date. If we take into consideration the distances from west-central Mexico to central Panama (2,450 km), from central Panama to eastern Colombia (900 km), from eastern Colombia to eastern Ecuador (1,000 km), and from eastern Ecuador to Guitarrero Cave (700 km), and apply a fast diffusion rate to the first and third tracts and a slower rate to the second and last tracts, we can estimate the time it took bean to travel from west-central Mexico to Guitarrero Cave as 4,200 years, placing the domestication of bean around 11,900 BP. If we then calculate the distance from west-central Mexico to central Panama (2,450 km), from central Panama to eastern Colombia (1,100 km), and from eastern Colombia to San Carlos (800 km), this gives us 3,200 years, suggesting beans reached the proto-Arawak around 8,700 BP.

[d]If we accept that manioc was domesticated in Rondonia/Acre, but it's earliest remains were found in central Panama, this means it was domesticated much earlier. If we consider the distances from Rondonia/Acre to eastern Colombia (1,700 km), and from eastern Colombia to central Panama (900 km), and we apply a fast diffusion rate to the first tract and a slower rate to the second tract, this gives us 2,200 years, which would establish the date of domestication of manioc around 9,200 BP. If we then consider the distance from Rondonia/Acre to San Carlos (1,300 km) and apply a fast rate of transmission, this would mean that manioc could have reached the origin place of the proto-Arawak around 8,300 BP.

[e]If we accept that cotton was domesticated somewhere around the western Ecuador/Peru border, but it's earliest remains were found in Ñanchoc Valley and dated 5,500 BP, this means that it was domesticated earlier. If we then consider the distance from Ñanchoc Valley and the Ecuador/Peru border (800 km) and apply a fast diffusion rate, this gives us 500 years, which would place the domestication of cotton around 6,000 BP. If we then consider the distances from the Ecuador/Peru border to eastern Ecuador (200 km) and from eastern Ecuador to San Carlos (1,500 km), and apply a slow diffusion rate to the first tract and a faster rate to the second, this suggests that cotton reached the proto-Arawak around 4,800 BP.

[f]If we accept that yam was domesticated somewhere near the Guyana/Brazil border, but it's earliest remains were found in Sambaqui do Forte and dated 5,500 BP, it is clear that it was domesticated at an earlier date. If we consider the distance from Sambaqui do Forte to the Guyana/Brazil border (3,000 km) and apply a fast rate of transmission, this gives us 2,000 years, placing the domestication of yam around 7,500 BP. If we then calculate the distance from the Guyana/Brazil border to San Carlos (800 km) and apply a slow rate of transmission (since it would have to traverse the Guiana highlands), we obtain 1,000 years, which would mean that yam may have reached the proto-Arawak around 6,500 BP.

[g]If we accept that coca was domesticated somewhere in northeastern Peru, but it's earliest remains were found in the Huarmey Valley and dated 4,500 BP, this means that it was domesticated earlier. If we calculate the distance from northeastern Peru to Huarmey Valley (400 km) and apply a slow rate of diffusion, this gives us 500 years, placing the domestication of coca around 5,000 BP. If we then calculate the distance from northeastern Peru to San Carlos (1,400 km) and apply a fast rate of transmission, this gives us 900 years, which would mean that coca could have reached the proto-Arawak around 4,100 BP.

[h]If we accept that chili pepper was domesticated in eastern Bolivia, but it's earliest remains were found in Huaca Prieta and dated 4,000 BP this means that it was domesticated earlier. If we calculate the distance from eastern Bolivia to northeastern Peru (1,900 km) and from northeastern Peru to Huaca Prieta (300 km), and apply a fast rate of diffusion to the first tract and a slower to the second, this gives us 1,700 years, which would place the domestication of chili pepper at around 5,700 BP. If we then calculate the distance from eastern Bolivia to San Carlos (2,200 km), and apply a fast rate of transmission, this gives us 1,500 years, suggesting that chili pepper reached the proto-Arawak at around 4,200 BP.

[i]If we accept that peach palm was domesticated in Rondonia/Acre, but it's earliest remains were found in Quebrada Seca and dated 2,300 BP, this means that it was domesticated much earlier. If we then calculate the distance from Rondonia/Acre to eastern Colombia (1,700 km), from eastern Colombia to central Panama (900 km), and from central Panama to Quebrada Seca (300 km), and apply a fast diffusion rate to the first and last tracts and a slower rate to the second, we obtain 2,300 years, which would place the domestication of peach palm at around 4,600 BP. If we then calculate the distance from Rondonia/Acre to San Carlos (1,300 km) and apply a fast diffusion rate, we obtain 900 years, suggesting that peach palm reached the place of origin of the proto-Arawak around 3,700 BP.

however, Dillehay et al. (2010) found remains of chewed coca leaves and limestone in Ñanchoc Valley, located on the western slopes of the Peruvian northern Andes, which they dated around 8,000 B.P. Although they do not explicitly say that coca had been domesticated by then, they suggest this possibility when asserting that lime or calcite was being produced collectively to chew together with coca at about the same time as systematic farming was taking off in the region. Given that there is general agreement that coca was domesticated in the Peruvian montaña, right across the Andes from where these remains were found, its date of domestication would be even earlier, probably around 9,000 B.P. This would make coca the oldest domesticated plant in tropical America, even older than maize, peanuts and beans. Not being an archaeologist, I am in no capacity to question the date obtained by Dillehay et al. (2010). However, until this early date is confirmed by similar findings in other sites and at intermediate dates, I will remain somewhat skeptical.

Why would plants domesticated earlier be attributed a sublime origin, whereas plants domesticated more recently assigned a grotesque origin? I suggest that this is related to the degree of ''culturality'' of these plants. The oldest domesticated plants have been part of Yanesha culture and society for a much longer period than the other plants. Plants in this category cover Yanesha people's main needs in the fields of nutrition (manioc, maize, beans and peanuts), and clothing (cotton). They form part of the core of Yanesha culture and thus appear as being ''more cultural'' than other plants. This quality is reflected in the narratives that recount their origin. From a Yanesha point of view, culture is not so much a matter of material achievement, but rather the attainment of a certain moral state of affairs. Cultured or civilized people are those who know how to ''live well,'' that is, people who live in harmony and abide by the norms of unrestricted generosity and generalized reciprocity (Santos-Granero 2000). But also they are people who know how to control their negative emotions –anger, envy, greed, hatred– through the force of their thoughts, thus avoiding conflict and social disruption. In mythical discourse, the culturality of plants in this category is expressed by representing them as primordial beings that led a moral life; beings that were created by the love and compassion of the higher divinities, and that showed their morality through acts of generosity, self-control, and self-sacrifice.

In contrast, plants domesticated in more recent times have been part of Yanesha lifeways for a much shorter period. They have undoubtedly become an important part of Yanesha cultural life, but they are complementary plants; their absence would not put at risk Yanesha subsistence and reproduction. It is in this sense that it could be said that they are ''less cultural.'' Chili peppers, yams, and peach palm constitute nice additions to Yanesha diet, but they contribute only a minor portion of overall Yanesha nutrition. Coca is central in decision-making processes concerning healing, hunting, and fishing, but Yanesha people could still do well without it. The same can be said of barbasco, which provides a nice means of large-scale fishing. If this plant were to disappear, however, Yanesha people would still be able to fish with nets, fish traps, bows and arrows, and lines and hooks. Their complementary rather than central position in Yanesha culture is reflected in mythical discourse, which depicts the primordial beings who gave origin to these

plants as amoral people; people who could not control their emotions and desires and were thus incapable of acts of generosity and self-sacrifice.

It could be argued that absolute time of domestication is not equivalent to the time of adoption of these plants by the Yanesha. Unfortunately, the philological method proposed by Balée (1994, 2000) to determine the time of adoption of different plants and plant knowledge by native Amazonian peoples, or the historical linguistics approach advocated by Blench (2007) to reconstruct the history of agriculture in Africa would be of little use here, for they provide only very broad date ranges. Since at present we have no direct way of determining when these plants were adopted by the Yanesha, I propose to use as a proxy the time of arrival of these plants among, if not the Yanesha, at least their ancestors, the proto-Arawak. Such an indicator would provide us with a broad estimate, if not of the time of adoption of these plants by the proto-Arawak, at least of the time when these plants became available for adoption to the ancestors of the Yanesha.

Most specialists agree that the proto-Arawak lived somewhere along the Negro River in the region between the Upper Amazon and the Middle Orinoco around the present-day town of San Carlos (Aikhenvald 1999; Heckenberger 2002; Lathrap 1970). According to Noble (1965), the process of dispersal and fragmentation of the proto-Arawak into the Arawak-speaking peoples we know today took place around 3,500-5,000 B.P. The proto-Arawak are renowned for their agriculture and settled mode of life, two of the factors that are said to have ensured their success in colonizing new lands (Hill and Santos-Granero 2002; Radin 1946:30). At the time of their dispersal they were already full-fledged horticulturalists with maize and manioc as their staples (Radin 1946:25). This suggests that they had already acquired most of the plants in the sample before 5,000 B.P.

To calculate the time around which these plants became available to the proto-Arawak it is necessary to know the place of domestication, the distance from the place of domestication to the proto-Arawak homeland and, more importantly, the rates of diffusion of these plants. With the exception of peach palm, there is general agreement about the place of domestication of all the plants in the sample. The distance from place of domestication to the proto-Arawak homeland can be calculated through an online travel distance calculator (see www.mapcrow.info). As to the rates of diffusion, a quick review of Plotnicov and Scaglion's (1999) book, *Consequences of Cultivar Diffusion*, clearly shows that these are not constant and that the adoption of any given plant depends on a variety of objective (geography, soils, plant productivity) and intangible (social, ritual and psychological) factors. However, if the diffusion of maize from Central to South America can be taken as archetypal, we could conclude that the speed by which domesticated plants disseminated throughout America depended to a great extent on geographical factors. According to dates provided by Iriarte (2007:Table 9.1), maize was domesticated in west-central Mexico (Balsas Valley) around 8,700 B.P., and was being cultivated in central Panama (Aguadulce) around 7,000 B.P., in Ecuadorian Amazonia (Lake Ayauchi) around 5,300 B.P., in coastal Peru (Huarmey Valley) around 4,100 B.P., and in eastern Brazil (Lake Geral) around 3,350 B.P. Now, given that the dates on the domestication of maize are constantly changing thanks to new techniques of identification and dating, as well as new excavations, the following discussion should be taken as a model to

be refined as new data comes in. Bearing this in mind, if we consider the distances between the above archaeological sites and the dates in which maize was already being cultivated in these places, we may estimate that maize traveled at a relatively fast rate of 1.4 km/yr between the Balsas Valley and Aguadulce (2,450 km); at slower rates of 1.0 km/yr between Aguadulce and Lake Ayauchi (1,750 km) and of 0.7 km/yr between Lake Ayauchi and Huarmey Valley (800 km); and at a faster rate of 1.6 km/yr between Lake Ayauchi and Lake Geral (3,100 km). These data are consistent and suggest that maize moved at a relatively quick mean rate of 1.5 km/yr in lowland areas, specifically, between west-central Mexico and central Panama while traversing the low coastal valleys along the Pacific littoral, and between western and eastern Amazonia thanks to the region's vast fluvial network, which provides a fast means of communication. In contrast, it moved at a much slower mean rate of 0.85 km/yr in highland areas, that is, from central Panama to Ecuadorian Amazonia and from central Panama to the Peruvian northern coast, where it had to traverse the more rugged and difficult topography of the northern Andes.

Taking into consideration the distance between the places of domestication of these plants and the proto-Arawak homeland (San Carlos), and then applying the mean rates of diffusion postulated for maize according to the kind of geography each of these plants had to traverse to reach the proto-Arawak, I estimate the time when these plants became available for adoption to the ancestors of the Yanesha. The results of the exercise, shown in Table 3, are consistent, suggesting that most plants in the sublime origin category arrived in the proto-Arawak homeland before 6,500 B.P., whereas all the plants in the grotesque origin category arrived after this date and before 3,700 B.P. The only exception is cotton, but I am inclined to think that this incongruity is due to the fact that the date of domestication of cotton has been consistently underestimated. The data in this table also postulate that by the time in which the proto-Arawak began to disperse throughout Amazonia around 5,000 B.P., they were probably in possession of all the plants in the sublime origin category. In contrast, all the plants in the grotesque origin category, with the exception of yam, would have arrived in the proto-Arawak homeland after that date, suggesting that they must have been acquired after the diaspora began. This was probably the case for the proto-Yanesha, who, according to Lathrap (1970:96), arrived in the Pachitea/Palcazu basin, where their descendants live today, around 3,500 BP. The fact that sublime origin plants were acquired before the beginning of the Arawakan diaspora, whereas grotesque origin plants were obtained during the diaspora and before the Yanesha settled in their present-day territory, reinforces the notion that sublime origin plants are part of the cultural core of the proto-Arawak and their descendants and that these plants are thus conceived of as being more ''cultural'' than those of grotesque origin.

Conclusions

Sublime and grotesque modes of transformation may lead to similar results: the transformation of formidable mythical beings into important present-day plants. They are predicated, however, on completely different moral attitudes and

bodily metamorphoses. The resplendent, wise and generous gods that gave life to manioc, maize, beans, peanuts, and cotton present a stark contrast to the lascivious, wicked or dim witted ogres, *femmes fatales*, and *faux* children that gave origin to barbasco, chili pepper, coca, peach palm, and yam. Sublime transformations involved acts of love, compassion, and generosity; feelings that arise from good thoughts and intentions or, as the Yanesha would say, ''from the heart.'' Plants in this category appeared as the result of the luminous, self-contained and clean transformation of the bodies, parts of bodies, or body ornaments of these generous beings. They came into being through acts of self-sacrifice and purification. In contrast, grotesque transformations result from the punishment of immoral mythical beings whose depravity is manifested at the physical level under the form of bodily incontinence, particularly in connection to the orifices of the lower body. Plants in this category came into existence as a transformation of the bodily excretions or mutilated body parts of their primordial ancestors; selfish, deceitful and stingy mythical beings who refused to share their possessions with the Yanesha. Some of them redeemed themselves at the end of their lives with a gesture of unexpected generosity, but these late acts of kindness did not spare them from experiencing grotesque transformations.

In accordance with the constructional character of native Amazonian cosmologies, Yanesha often conceive of plants as having a composite anatomy, one which combines bodily parts as well as a variety of more or less personal objects (Santos-Granero 2009a). Manioc tubers originated in Manioc-Person's legs, whereas their thick brown peel appeared as a transformation of his dark brown tunic. Maize ears are tightly wrapped in Maize-Person's green tunic. His fair skin became the whitish peel that covers fresh kernels, whereas his blond hair turned into the yellow silks that emerge from the end of corn ears. Maize-Person's beautiful feather headdress turned into the tassel, the inflorescence of male flowers that grows at the top end of maize plants. Coca bushes sprung from the torn body parts of Our Mother Coca. Coca leaves emerged as a transformation of her vaginal flow, whereas her broken bead necklace turned into the bright red fruit of coca trees. ***Hua't̃ena's*** oversized penis turned into the long fleshy roots of barbasco, the white juice that flows from these roots when pounded being a transformation of his poisonous semen. Finally, the stake with which Peach Palm-Person was impaled became the trunk of the peach palm; whereas the seeds of his chest bands became the different types of peach palm fruit that exist today: ***yetspuem̃***, the red variety; ***cororrem̃***, the yellow variety; and ***sherenquëm̃***, the mottled variety.

In brief, the appearance of plants entailed processes of bodily de-constitution and reconstitution marked by extreme forms of interspecific permutation of body parts, including bodily fluids and body ornaments: legs that turn into tubers; semen that becomes poisonous plant juices; tunics that turn into bark; feathers that turn into flowers; chest bands that turn into fruit. The equivalence between bodily parts and substances, on the one hand, and body ornaments, on the other hand, is explained by the widespread Amerindian notion by which personal ornaments of daily use are thought to become gradually infused with the soul of their owners until they turn into veritable ''extra-somatic body parts'' (Erikson 2009:187). Among Yanesha people, this process of ''ensoulment'' affects all kinds

of ornaments –headdresses, necklaces, wrist bands, chest bands– but it is particularly strong in the case of tunics, which are often conceived of as being equivalent to bodies (Santos-Granero 2009a). It is thus not surprising that the long cotton tunics worn by the Yanesha have played such an important role in the constitution of present-day plants in mythical times.

In contrast with the ''creationist'' character of Judeo-Christian religions, which contend that the world was made out of nothing by an all powerful, omniscient and omnipresent god, native Amazonian cosmologies propose that creation is rarely *ex nihilo*. It is always an act of re-creation by which powerful demiurges use their creative capacities to transform pre-existing things. Yanesha plants have appeared as the result of such acts of primordial bricolage. These creative acts were not, however, morally neutral. Sometimes they entailed acts of loving generosity and sublime transformations. Other times they involved acts of extreme selfishness and meanness that led to violent, grotesque transformations. Yanesha cultivated plants betray these mixed origins. Their inclusion into one or other category is not, however, accidental. It reflects their antiquity and degree of culturality, which is tantamount to saying their importance for the survival of Yanesha people.

References Cited

Aikhenvald, Alexandra Y.
1999 The Arawak Language Family. In *The Amazonian Languages*, eds. Robert M.W. Dixon and A.Y. Aikhenvald, pp. 65–106. Cambridge University Press, Cambridge.

Århem, Kaj
1981 *Makuna Social Organization: A Study in Descent, Alliance and the Formation of Corporate Groups in the North-Western Amazon*. Almqvist & Wiksell International, Uppsala.

Balée, William L.
1989 The Culture of Amazonian Forests. In *Resource Management in Amazonia: Indigenous and Folk Strategies*, eds. Darrell A. Posey and William L. Balée, pp. 1–21. The New York Botanical Garden, New York.
1994 *Footprints of the Forest: Ka'apor Ethnobotany. The Historical Ecology of Plant Utilization by an Amazonian People*. Columbia University Press, New York.
2000 Antiquity of Traditional Ethnobiological Knowledge in Amazonia: The Tupi-Guarani Family and Time. *Ethnohistory* 47(2):399–422.

Blench, Roger
2007 Using Linguistics to Reconstruct African Subsistence Systems: Comparing Crop Names to Trees and Livestock. In *Rethinking Agriculture: Archaeological and Ethnoarchaeological Perspectives*, eds. Tim Denham, José Iriarte and Luc Vrydaghs, pp. 408–438. Left Coast Press, Walnut Creek, CA.

Berlin, Brent and Elois A. Berlin
1977 *Ethnobiology, Subsistence, and Nutrition in a Tropical Forest Society: The Aguaruna Jivaro*. Studies in Aguaruna Jivaro Ethnobiology, Report No. 1. Language Behavior Research Laboratory, University of California, Berkeley.

Bonavia, Duccio, Laura W. Johnson, Elizabeth J. Reitz, Elizabeth S. Wing, and Glendon H. Weir
1993 Un Sitio Precerámico de Huarmey (PV 35–6) Antes de la Introducción del Maíz. *Boletín del Instituto Francés de Estudios Andinos* 22(2):409–442.

Carneiro, Robert
1978 The Knowledge and Use of Rainforest Trees by the Kuikuru Indians of Central Brazil. In *The Nature and Status of Ethnobotany*, ed. Richard I. Ford, pp. 201–216. Museum of Anthropology, University of Michigan, Ann Arbor.

Chagnon, Napoleon A.
1968 *Yanomamö: The Fierce People*. Holt, Rinehart &Winston, New York.

Chernela, Janet M.
1985 Indigenous Fishing in the Neotropics: The Tukanoan Uanano of the Black-water Uaupes River Basin in Brazil and Colombia. *Interciencia* 10:78–86.

Clement, Charles R.
1988 Domestication of the Pejibaye Palm (*Bactris gasipaes*): Past and Present. In *The Palm-Tree of Life*, ed. Michael J. Balick, pp. 155–174. *Advances in Economic Botany* 6: 155–174.
1999 1492 and the Loss of Amazonian Crop Genetic Resources. *Economic Botany* 53: 188–202.

Clement, Charles R., Michelly de Cristo-Araújo, Geo Coppens d'Eeckenbrugge, Alessandro Alves Pereira, and Doriane Picanço-Rodrigues
2010 Origin and Domestication of Native Amazonian Crops. *Diversity* 2:72–106.

Corrales-Ulloa, Francisco and Jorge Mora-Urpi
1990 Sobre el Proto-pejibaye en Costa Rica. *Boletín Pejibaye* 2(2):1–11.

Coursey, Donald G.
1967 *Yams*. Longman, London.

Denevan, William M., John M. Treacy, Janis B. Alcorn, Christine Padoch, Julie Denslow, and Salvador Flores Paitán
1984 Indigenous Agroforestry in the Peruvian Amazon: Bora Indian Management of Swidden Fallows. *Interciencia* 9: 346–357.

Descola, Philippe
1996 *In the Society of Nature: A Native Ecology in Amazonia*. Cambridge University Press, Cambridge.

Dillehay, Tom D., Jack Rossen, Thomas C. Andres, and David E. Williams
2007 Preceramic Adoption of Peanut, Squash, and Cotton in Northern Peru. *Science* 316:1890–1893.

Dillehay, Tom D., Jack Rossen, Donald Ugent, Anathasios Karathanasis, Víctor Vásquez, and Patricia J. Netherly
2010 Early Holocene Coca Chewing in Northern Peru. *Antiquity* 84(326):939–953.

Dhurandhar, N.V. and K.C. Chang
1990 Effect of Cooking on Firmness, Trypsin Inhibitors, Lectins and Cystine/cysteine Content of Navy and Red Kidney Beans (Phaseolus vulgaris). *Journal of Food Science* 55(2):470–474.

Duff-Trip, Martha
1998 *Diccionario Yanesha' (Amuesha)-Castellano*. Serie Lingüística No. 47. Ministerio de Educación/Instituto Lingüístico de Verano, Lima.

Erikson, Philippe
2009 Obedient Things: Reflections on the Matis Theory of Materiality. In *The Occult Life of Things: Native Amazonian Theories of Materiality and Personhood*, ed. Fernando Santos-Granero, pp. 173–191. The University of Arizona Press, Tucson.

Gow, Peter
2007 ''Ex-Cocama:'' Transforming Identities in Peruvian Amazonia. In *Time and Memory in Indigenous Amazonia: Anthropological Perspectives*, eds. Carlos Fausto and Michael Heckenberger, pp. 194–215. University Press of Florida, Gainesville.

Gragson, Ted L.
1992 Fishing the Waters of Amazonia: Native Subsistence Economies in a Tropical Rain Forest. *American Anthropologist* 94: 428–440.

Hecht, Susan B.
1990 Indigenous Soil Management in the Latin American Tropics: Neglected Knowledge of Native Peoples. In *Agroecology and Small Farm Development*, eds. Miguel A. Altieri and Susan B. Hecht, pp. 151–160. CRC Press, Boston.

Heckenberger, Michael J.
2002 Rethinking the Arawakan Diaspora: Hierarchy, Regionality, and the Amazonian Formative. In *Comparative Arawakan Histories: Rethinking Language Family and Culture Area in Amazonia*, eds. Jonathan D. Hill and Fernando Santos-Granero, pp. 99–122. University of Illinois Press, Urbana and Chicago.

Hill, Jonathan D. and Fernando Santos-Granero, editors
2002 *Comparative Arawakan Histories: Rethinking Language Family and Culture Area in Amazonia*. University of Illinois Press, Urbana and Chicago.

Huanca, Tomás
1999 Tsimane Indigenous Knowledge Swidden Fallow Management and Conservation. Ph.D. dissertation. University of Florida, Gainesville.

Iriarte, José
2007 New Perspectives on Plant Domestication and the Development of Agriculture in the New World. In *Rethinking Agriculture: Archaeological and Ethnoarchaeological Perspectives*, eds. Tim Denham, José Iriarte and Luc Vrydaghs, pp. 167–188. Left Coast Press, Walnut Creek.

Irvine, Dominique
1989 Succession Management and Resource Distribution in an Amazonian Rain Forest. In *Resource Management in Amazonia: Indigenous and Folk Strategies*, eds. Darrell A. Posey and William L. Balée, pp. 223–237. The New York Botanical Garden, New York.

Johnson, Allen
1983 Machiguenga Gardens. In *Adaptive Responses of Native Amazonians*, eds. Raymond B. Hames and William T. Vickers, pp. 29–64. Academic Press, New York.

Lathrap, Donald W.
1970 *The Upper Amazon*. Thames and Hudson, London.

Moran, Emilio F.
1991 Human Adaptive Strategies in Amazonian Blackwater Ecosystems. *American Anthropologist* 93:361–382.

Morcote-Rios, G. and R. Bernal
2001 Remains of Palms (Palmae) at Archaeological Sites in the New World: A Review. *Botanical Review* 67:309–350.

Noble, G. Kingsley
1965 Proto-Arawakan and its Descendants. *International Journal of American Linguistics* 31(3):1–129.

Overing, Joanna
2006 The Stench of Death and the Aromas of Life: Poetics of Ways of Knowing and Sensory Process among Piaroa of the Orinoco Basin. In *In the World and About the World: Amerindian Modes of Knowledge*, eds. Fernando Santos-Granero and George Mentore, pp. 9–32. Special issue in honor of Prof. Joanna Overing. *Tipití* 4(1–2):9–32.

Pearsall, Deborah M.
1992 The Origins of Plant Cultivation in South America. In *The Origins of Agriculture. An International Perspective*, eds. C. Wesley Cowan and Patty Jo Watson, pp. 173–205. Smithsonian Institution Press, Washington.

Perry, Linda, Ruth Dickau, Sonia Zarrillo, Irene Holst, Deborah M. Pearsall, Dolores R. Piperno, Mary Jane Berman, Richard G. Cooke, Kurt Rademaker, Anthony J. Ranere, J. Scott Raymond, Daniel H. Sandweiss, Franz Scaramelli, Kay Tarble, and James A. Zeidler
2007 Starch Fossils and the Domestication and Dispersal of Chili Peppers (*Capsicum* spp. L.) in the Americas. *Science* 315:986–987.

Pickersgill, Barbara
2007 Domestication of Plants in the Americas: Insights from Mendelian and Molecular Genetics. *Annals of Botany* 100(5):925–940.

Piperno, Dolores R. and Deborah M. Pearsall
1998 *The Origins of Agriculture in the Lowland Neotropics*. Academic Press, San Diego.

Piperno, Dolores R., Anthony J. Ranere, Irene Holst, and Patricia Hansell
2000 Starch Grains Reveal Early Root Crop Horticulture in the Panamanian Tropical Forest. *Nature* 407:894–897.

Piperno, Dolores R., Anthony J. Ranere, Irene Holst, Jose Iriarte, and Ruth Dickau
2009 Starch Grain and Phytolith Evidence for Early Ninth Millennium B.P. Maize from the Central Balsas River Valley, Mexico. *Proceedings of the National Academy of Sciences* 106(13):5019–5024.

Plotnicov, Leonard and Richard Scaglion, editors
1999 *Consequences of Cultivar Diffusion*. University of Pittsburgh, Pittsburgh.

Pohle, Perdita and Sylvia Reinhardt
2004 Indigenous Knowledge of Plants and their Utilization Among the Shuar of the Lower Tropical Mountain Forest in Southern Ecuador. In *Memoria del IV Congreso Ecuatoriano de Botánica*, eds. Pablo Lozano, Reiner Bussmann and Hugo Navarrete, pp. 363–384. Funbotánica, Loja.

Posey, Darrell A.
1983 Indigenous Ecological Knowledge and Development. In *The Dilemma of Amazonian Development*, ed. Emilio Moran, pp. 225–257. Westview Press, Boulder.

Purseglove, John W.
1968 *Tropical Crops. Dicotyledons*. Wiley, New York.

Radin, Paul
1946 *Indians of South America*. Doubleday & Company Inc., Garden City, NY.

Reichel-Dolmatoff, Gerardo
1978 Desana Animal Categories, Food Restrictions and the Concept of Color Energies. *Journal of Latin American Lore* 4(2):243–291.

Rival, Laura and Doyle McKey
2008 Domestication and Diversity in Manioc (*Manihot esculenta* Crantz ssp. *esculenta*, Euphorbiaceae). *Current Anthropology* 49: 1119–1128.

Salick, Jan
1989 Ecological Basis of Amuesha Agriculture. *Advances in Economic Botany* 7:189–212.

Santos-Granero, Fernando
1991 *The Power of Love: The Moral Use of Knowledge Amongst the Amuesha of Central Peru*. Athlone Press, London.
1992 The Dry and the Wet: Astronomy, Agriculture and Ceremonial Life in Eastern Peru. *Journal de la Société des Americanistes* 78(2):107–32.
2000 The Sisyphus Syndrome or the Struggle for Conviviality in Native Amazonia. In *The Anthropology of Love and Anger. The Aesthetics of Conviviality in Native Amazonia*, eds. Joanna Overing and Alan Passes, pp. 268–287. Routledge, New York.

2002 St. Christopher in the Amazon: Child Sorcery, Colonialism, and Violence Among the Southern Arawak. *Ethnohistory* 49(3): 507–543.

2004a The Enemy Within: Child Sorcery, Revolution and the Evils of Modernization in Eastern Peru. In *In Darkness and Secrecy: The Anthropology of Assault Sorcery and Witchcraft in Amazonia*, eds. Neil L. Whitehead and Robin M. Wright, pp. 272–305. Duke University Press, Durham.

2004b Los Yanesha. In *Guía Etnográfica de la Alta Amazonía. Volumen IV: Matsigenka, Yanesha*, eds. Fernando Santos and Frederica Barclay, pp. 159–359. Smithsonian Tropical Research Institute and Instituto Francés de Estudios Andinos, Lima.

2009a Introduction: Amerindian Constructional Views of the World. In *The Occult Life of Things: Native Amazonian Theories of Materiality and Personhood*, ed. Fernando Santos-Granero, pp. 1–29. University of Arizona Press, Tucson.

2009b Hybrid Bodyscapes: A visual History of Yanesha Patterns of Cultural Change. *Current Anthropology* 50:477–512.

Scheel-Ybert, Rita

2001 Man and Vegetation in Southeastern Brazil During the Late Holocene. *Journal of Archaeological Science* 28:471–480.

Shepard Jr., Glenn H.

1997 Noun Classification and Ethnozoological Classification in Machiguenga: An Arawakan Language of the Peruvian Amazon. *Journal of Amazonian Languages* 1(1): 29–57.

Smith, Richard Chase

1977 Deliverance from Chaos for a Song. Preliminary Discussion of Amuesha Music. Ph.D. Dissertation (Anthropology). Cornell University, Ithaca.

Smith, Richard Chase and Espíritu Bautista Pacual

2006 Our Mother Palla, Our Sister Spider, the Evening Star and the Morning Star. How Yanesha People Learned to Make and Decorate Textiles. In *Enigmatic Textile Art of the Peruvian Amazon*, ed. Gredna Landolt Pardo, pp. 105–117. Gráfica Biblos, Lima.

Sponsel, Leslie E.

1986 Ecology and Adaptation. *Annual Review of Anthropology* 15:67–97.

Van Andel, Tinde

2000 The Diverse Uses of Fish-poison Plants in Northwest Guyana. *Economic Botany* 54:500–512.

Vilaça, Aparecida

2007 Cultural Change as Body Metamorphosis. In *Time and Memory in Indigenous Amazonia: Anthropological Perspectives*, eds. Carlos Fausto and Michael Heckenberger, pp. 194–215. University Press of Florida, Gainesville.

Wilbert, Johannes

1986 Warao Cosmology and Yekuana Roundhouse Symbolism. In *Myth and the Imaginary in the New World*, eds. Edmundo Magaña and Peter Mason, pp. 427–458. Foris Publications, Dordrecht.