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Lunar agriculture in Mesoamerica

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Abstract

Though the moon's role in choosing the proper time for planting, harvesting and woodcutting is widely attested in ethnographic reports, the cultural logic and structure of actions by which this celestial body is perceived and used has not been satisfactorily explained. The aim of this paper is to offer such an explanatory framework within which the role of the moon in the agricultural cycle may be explained. My examples of the beliefs about lunar agriculture derive from the Mesoamerican cultural tradition.

Keywords: *lunar agriculture, Mesoamerican archaeoastronomy.*

In qualli quilchiuhqui, tlanêmâtcachioani, tlaiuiachioani, iiel, tlâceliani, tlamocuitlauiani, tlacenmatini, mozcaliani, amoxmatini, tonalpoani, metztlapoani, xippoani

The good horticulturist [is] a careful worker, a calmworker – diligent, solicitous, careful of things, dedicated, able; a knower of books, a reader of day signs [of 260-day cycle], a reader of the months [i.e. moon-count], a reader of the years.

Florentine Codex, Book 10, Ch. 12

"[most people]... watch...for the beginning of breeding and sowing, the aspects of the moon s light at its full, and no one ever condemns such practices either as impossible or useless..."

C. Ptolemy – Tetrabiblos, Book 1, Ch. 3:14

"L'influence de la lune croissante ou décroissante, d'ailleurs, n'a pas été appliquée seulement à la croissance des organismes et spécialement des plantes, mais elle a été étendue par analogie aux entreprises humaines; bien des peuples ont cru qu'il fallait entreprendre une affaire pendant la première période de la lune, mais éviter de s'y engager en lune décroissante"

Berthelot 1949 : 33

Introduction

The idea that the Moon affects the growth of plants is a widespread folk-belief related to the almost universal association of this luminary with the concepts of fertility. Many ancient and modern societies believe that female biological functions are closely connected to the cycles of the Moon and define both the length of a menstrual cycle and the average duration of the human gestation period in terms of the lunar count.

Furthermore many societies metaphorically compare the cycles of crop growth to major events in a human lifetime; so they easily transfer traditions linking the Moon with human fertility to critical agricultural operations. Conventionally they consider that the best moments for planting and harvesting as well as for animal life and human conception are governed by the Moon (Van Gennep 1960, 180-181).

The ways in which this traditional lore is structured depends upon the cultural dispositions used to construct meaningful relationships between perceived objects, events and processes. No matter what media are used to express those relationships, they all assume that environmental phenomena are basically semiotic in their essence; not only they are experienced as such, but, above all, interpreted as meaningful with reference to a symbological framework located beyond the limits of the immediate environmental situation (Nöth 1998, 334-338). Nonetheless, while metaphors describing the relationship between lunar phases and critical moments of events in the agricultural cycle may originate from the above-mentioned associations made between the Moon and fertility, the establishment of analogies, similarities, differences and correspondences depends on structural and symbolic guidelines which are ordered according to some type of a culture-dependent model (Descola 1996, 91-93; Nöth 1998). Though the Moon is believed to be actively involved in reproductive practices, the way in which this luminary exerts influence is determined by categories which reflect the specificity of cultural systems of knowledge.

For example, early Greek sources show that the lunar cycle used in agriculture was divided into three phases: the waxing Moon, the mid-month, and the waning Moon (Hesiod 1982, 59-65 [*Works and Days*]). This confirms our knowledge of the structure of the Greek lunar calendar. Roman authors however, paid attention to the phases of the waxing and waning Moon (Cicero 1979, 171-173 [*De Natura Deorum* II, XIX, 50]; Varro 1979, 261 [*On Agriculture*, I, XXXVII, 1-3]). Greek and Roman societies created different worlds to live in so their planting rules followed different systems of the lunar count.

Lunar agriculture in Europe

Many lunar planting rules emphasize the differences between the effects of the waxing and waning Moon. Classical tradition links the waning phase with moisture and the waxing phase with dryness, (see Table 1 and Aulus Gellius 1967, 445 [*Attic Nights*, Bk. XX, VIII]; Pliny 1967, 349 [*Natural History*, Bk. II, CII)]; Plutarch 1987, 211, 215, 223, 225-227 [*Moralia*, vol. XV, *fragments on Hesiod*, 101, 105, 109, 111]). Within this logic, the waning moon is good for the felling of trees, when they are driest and preserved best, and for the castration of animals, when excessive bleeding is avoided. This logic is supplemented with the idea that plants' sap is rising during the waxing Moon and descending during the waning Moon (compare the opinions of the ancient authors: Cicero 1971, 407 [*De Divinatione* II, XIV.33]; Hesiod 1982, 63 [*Works and Days*]; Plutarch 1987, 221-223 [*Moralia, fragments* 109]).

In its refined version this model stems from the Classical system of the four primary qualities: warmth, coldness, dryness and moisture, based on Hippocratic-and-Galenean theories of four elements (earth, fire, water and air) which build up the world in varying proportions (see Table 2). The Moon is defined as a feminine and moistening "star" during the waxing phase (e.g. Pliny 1967, 351 [*Natural History*, Bk. II, civ], she gradually heats the humidity around the phase of the Full Moon (Plutarch 1987, 215, 221-223, 225 [*Moralia, fragments* 105, 109,

111] to dry up the plants during the waning phase (Aulus Gellius 1967, 445 [*Attic Nights*, Bk. XX, viii]; Plutarch 1987, 211 [Moralia, fragments 102]).

Table 1: *Qualities ascribed to the moon.*

Lunar phase	Lunar qualities
Waning	moisture, humidity, wetness
Waxing	dryness, aridness, desiccation

Slavic folk-beliefs show that the meanings of things in natural environment are established through the principles of analogy, morphological resemblance and correspondence (Moszynski 1967, 456-457; see Table 3). Briefly, "everything which is to prosper belongs to the time of the waxing moon" (Nilsson 1920, 154-155) and "anything begun when the moon is on the wane will dwindle and die" (Nilsson 1920, 341). In extreme situations, however, "the same things which grow with the waxing, dwindle with the waning moon" (Aulus Gellius 1967: 445 [*Attic Nights* Bk. XX, viii].

Table 2: *Relationship between four elements and qualities (early Greeks).*

	Wet	Dry
Cold	Water	Earth
Hot	Air	Fire

The structural and symbolic logic of Slavic agriculture also depends on the idea that crops that produce yields above ground and do not have an extensive root system should be planted/sowed during the waxing moon and those that produce yields below ground or develop a tree bark should be planted/sown during the waning moon (Moszynski (1967, 458). As all planting should be done when the moon is waxing (increasing), so the period of the waning moon is propitious for all plants growing "downward", under the ground. Lunar agriculture/ horticulture reveals very complex plant classification, with crops being categorized according to which part of the plant they were specifically grown for. These and other similar beliefs have been and still are popular among many European societies.

Planting by the Moon in the Americas

Beliefs about planting with the Moon exist on the other side of the Atlantic. For example, Krappe (1952, 100-101, who cites both modern and ancient authors) reports on French and American farmers who believe that plants' sap rises during the waxing Moon and descends during the waning Moon (compare similar opinions of the ancient authors: Cicero 1971, 407 [*De Divinatione* II, XIV.33]; Hesiod 1982, 63 [*Works and Days*]; Plutarch 1987, 221-223 [*Moralia, fragments* 109]). In a similar vein Warchalowski (1930, 55-56) describes practices avoiding woodcutting during the dark moon and waxing phases among European emigrants in Brazil.

Naturally, many such beliefs could easily be ascribed to emigrants who brought them from

Table 3: *Relationships between lunar phases and associate qualities among the Slavs.*

Lunar phase	**Meaning**	**Positive influence upon plants or their parts**
waxing (growing moon-disk)	growth and augmentation	ears of cereals, flowers
waning moon	decline and	roots, bulbs, onions
(weakening, vanishing moon)	decay	
full moon (disk-shaped)	completeness, plenitude (ranging from obesity to richness)	full seeds and ears
first days of the new crescent of the moon	renewal, rebirth, rejuvenation, and health	
"soft" and slim new crescent of the moon	Immaturity	
the "dark" of the moon	static condition	flax and hemp

Table 4: *The influence of the moon upon planting and harvesting according to the Maya. (Girard 1949, vol. 2, 466; Gossen 1984, 334; Guiteras-Holmes 1961, 35; Köhler 1991, 236-241; Redfield and Villa Rojas 1934, 205; Remington 1977; Tedlock 1991, 179-192, Iwaniszewski 1992, Vogt 1997, Wisdom 1940, 400).*

Positive influence upon plants/animals or their parts	New Moon	Waxing Moon	Around Full Moon	Full Moon and Waning	Waning
tomato, garlic, onion		planting, sowing			
chili				sowing[1]	
fruit trees (mango, orange, lime, ananas, chayote)[2]			picking of fruits		planting of trees
banana		planting of trees[3]		planting of trees	planting of trees
papaya		planting of trees			planting
coffee					planting
sugarcane		planning			
beans[4]		sowing	sowing	sowing	
squash			sowing	sowing	
root crops (camote, yuca)				planting	planting
trees felled for the house building[4]			felling cutting		
grapes (vine)		planting (to get small gourds)			
animals	castrating	killing		castrating	
all plants		planting (4 or 5 days after FiM)		planting (4 days after FuM)	planting (3 days before LM)

[1] Iwaniszewski (1992), Köhler (1991, 240): the Chol and Tzotil Maya, [2] Remington (1977:80) reports on the planting of lime trees on the third day after the first moon: the Cakchiquel, [3] Guiteras-Holmes (1961, 35): the Tzotzil, [4] beans is planted around the full moon (2 cases), during the waning moon (3 cases), around the first quarter (1 case). (Data from: Guiteras-Holmes 1961, 35; Iwaniszewski 1992 and Köhler 1991, 236-241; Tedlock 1991, 179-192): the Tzotzil, the Chol and the Quiche). Basically, the felling of trees for the house building occurs at the full moon or immediately after. This is reported for the Maya region in 7 cases. Only Tedlock (1991,) reports on woodcutting on the waning phase. Abbreviations: FuM = full moon, FiM = first moon, LM = last moon.

Europe, but the great popularity of such concepts in regions with a heavy indigenous and agricultural population raises questions about their exclusive non-American origin. Though the striking similarities between the beliefs in both continents may eventually be explained in terms of cultural borrowings and European (mostly Spanish) diffusion, we cannot a priori exclude the possibility that at least some of the them were of local origin (Baez-Jorge (1977; 1983; 1988, 253-254). According to Foster (1960, 60-61, 69) Spanish associations between lunar phases and agricultural cycles are at least partially derived from Classical Roman metaphors which consider the waxing moon as "hot and humid, as are healthy young people", and hence good for planting, sowing and grafting while the waning moon is "cold and damp, like (are) old people", good for harvesting and woodcutting. The European hot-and-cold complex which has supposedly been imported from Spain to America is, however, based, upon the system of the four basic qualities mentioned above. Mesoamericans, on the other hand, developed a system of complementary oppositions (such as pairing of male and female, hot and cold, dry and wet, sun and moon, etc.) underlying fundamental structural principles of their ordered universe. Despite their similarity, the two schemes use different structuring categories. Though both systems may easily be confused today,

Table. 5: *Planting by the Moon among the Nahua (Köhler 1991, 244-245, Gomez Maillifert 1918, 488, Gonz_lez Torres 1981, 94).*

	New Moon & Waxing Moon	Waxing Moon	Around Full Moon	Full Moon and Waning Moon
chayote, squash	planting/sowing			
maguey (agave)		sap extraction (for pulque)		
beans, peach,capul_n, flowers, onion, papaya, vegetables			planting/sowing	
maize	planting avoided		sowing, doubling of stalks, harvesting	
rubber	sap extraction			
wood, tree	felling avoided		felling	
animals, (pigs)	castrating done, castrating avoided[1]		castrating	castrating
all plants		planting		harvesting

[1]Gomez Maillifert 1918, 488

it seems reasonable to expect that the native societies of Mesoamerica would emphasize indigenous criteria of morphological, metaphorical and/or symbolic homologies eliciting relationships between lunar phases and plant growth and crop.

Mesoamerica

In Mesoamerica, meteorological-climatic and vegetation cycles were correlated with solar calendar dates, but the farmers paid special regard to a 260-day divinatory calendar. This means that even if the dates of the solar and divinatory calendar were considered propitious for specific agricultural activities, they still had to be aligned upon the proper lunar phase (see Gossen 1974,224).

A survey of the anthropological data indicates (Tables 4, 5, 6) that Mesoamericans usually emphasize the differences between the effects of the waxing and waning moon, but they also watch over the moments of the dark of the moon, first moon and full moon. Like farmers in the Old World, Mesoamericans also follow very concrete rules. In most cases Mesoamericans plant by the waxing (increasing) moon and harvest by the waning (decreasing) moon. Globular or sphere-shaped fruits are planted and cropped around the full moon (disk-like moon). Garlic and onion (European crops) are also planted and cropped around full moon. Generally, crops should not be planted during the new moon and/or around the day of the first moon. A thin crescent moon is perceived as representing a new, soft yet still immature quality so it is believed that anything that is sown/planted at that moment will never mature. First days of the waxing moon should be avoided because plants "will grow too tall" or "too long (Guiteras Holmes 1961, 35). Wood and tree should be felled or cut after the full moon and animals should be castrated near to the dark moon phase (during the declining or weak moon, to avoid excessive bleeding). We can therefore expect that if they had existed in Prehispanic times, all native rules for planting with the moon in Mesoamerica would have been synthetisized with Greco-Roman and Christian concepts.

In my opinion it is sufficiently evident that the basic and dominant rule that establishes correspondences between vegetation cycles and lunar phases derives from the idea that attributes heat to the sun and moisture to the moon.

Basically, whatever requires growth is initiated during the waxing moon. The waxing and "soft" moon attracts the water, because when she is invisible (the dark of the moon phase), she picks up water

Table. 6: *Planting by the Moon among the Zoque, Mixtec, Mixe, Popoluca and Huave (Baez-Jorge 1983, 390-391; Köhler 1991, 242-243; Munch 1983, 370-371; Lupo 1982, 291).*

	New Moon & Waxing	Around Full Moon	Full Moon and Waning Moon	Waning	Around New Moon
Zoque					
banana	sowing/planting				
beans, chayote, yucca,				planting	
timber, lumber, tree, cane for construction	woodcutting, avoided		felling		
honey				honey extraction	
pigs, horses					castrating
hens					sitting (incubating)
Mixtec					
banana, beans		plant/sowing			
maize		plant/sowing			
fishes		fishing			
timber/tree		felling			
animals	castrating				
Mixe					
timber/tree		woodcutting			
Popoluca					
timber/tree		woodcutting, planting			
Huave					
fishes		fishing			
timber/tree		felling			
animals		castrating			

from the earth and pours it over her body. The water gradually increases in volume until the maximum reached at the full moon. Girard (1949, 466-467) reports on the Chorti Maya from Guatemala who represent the moon in a form of a huge jar (container, see

Fig. 1: *A jar representing full moon (full jar), waning moon (pouring water out inclined jar), and waxing moon (half-empty and being filled up with water jar). After Girard (1949, 467).*

Figure 1) which during the waning phase becomes inclined so the water can pour the earth. Similarly, women are filled up at the full moon phase, so they menstruate at the waning phase (Girard 1949, 465). As women became "dry" during the rest of the period, so does the sky and therefore it does not rain abundantly during the rest of the lunar month. The Nahua from Sierra de Zongolica believe the astronomical new moon "is inside water" (Köhler 1991, 244) and the Zoque from Chiapas avoid doubling of maize stalks, ("to avoid moths"), nor do they they sit fowls (because "eggs will be watered") during the same phase (Baez-Jorge 1977, 35; 1983, 390). The aged moon goddess, Chak Chel, appears in streams of falling water in a flooding scene on page 74 of the post-classic Dresden Codex (Figure) where she holds a jar pouring water. Milbrath (1999, 145, 154-155, Figs. 4.7 and 4.8) provides many other examples of the connection between this aged moon goddess and rainwater pouring, attesting to a prehispanic origin of this belief.

Fig.2: *The great flood falling from the Cosmic Monster in company of the aged oon goddess Chak Chel and God L. Dresden Codex 74. After Villacorta and Villacorta (1977).*

Conclusions

In this paper I attempted to identify the rules of a symbolic logic by which the influence of the moon upon planting and harvesting in Mesoamerica was defined. While I have found that the metaphors used to define the relationship between the moon and plants are similar to those used in the Old World, I am suggesting that they easily may be derived from native representations of the lunar phases. There is wide but fragmentary evidence that reflects the prehispanic belief of the Mesoamerican agriculturalists that the moon influences the growth of plants.

It becomes evident that some amount of observational knowledge related to lunar phases was produced in the service of agriculture (see, Figure 3).

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Fig. 3: *Florentine Codex Bk 10, Ch. 12: "The good horticulturist [is] a careful worker...". Planting with the moon among the Aztecs – a moon, a divinatory book, and a plant of agave (maguey).*

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