

VINES OF THE SERPENT: A MORNING GLORY ETHNOBOTANICAL

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The two morning glories *Ipomoea violacea* and *Rivea corymbosa* have been used by the Aztecs and other Mesoamerican populations since before the Spanish conquest. The plants contain the psychoactive ergot alkaloids and are used in ritual communion sessions with the gods. This paper will serve as a general consensus for data on the morning glory and its role as a hallucinogen.

Key words: Morning glory, *Ipomoea violacea*, *Rivea corymbosa*, Zapotec, LSA, hallucinogen

INTRODUCTION

Among the more powerful vision-inducing plants used by the Mesoamericans were the morning glory vines *Ipomoea violacea* and *Rivea corymbosa*. So great are these two flowering vines, that they are engraved in a sixteenth-century stone statue of Xochipilli, the Prince of Flowers, who sits in an ecstatic trance (Schultes and Hofmann 1979). The morning glories were known as *coatl-xoxo uhqui*, “green snake,” or *coaxihuitl*, “snake plant” by the Aztecs who used them for medicine or in religious ceremony. The Aztecs called the seeds *tlitiltzin* and *ololuiqui* for the two species *I. violacea* and *R. corymbosa*, respectively. The Chinantecs and Mazatecs call the seeds *piule* and the Zapotecs call them *badoh negro*. All three groups still practice ritual use of the morning glory.

The seeds of morning glory were in full use when the Spanish Conquistadores arrived, and the invading missionaries did their best at getting rid of any pagan rituals such as the ones associated with the seeds. Among the earlier writings, one chronicler tells that *ololuiqui* was added to “mortars together with scorpions, live spiders, and centipedes, and they were ground, producing a diabolical, stinking, deadly ointment...which the natives applied to their bodies and drink to see visions” (Durán 1570). Another contemporary, Francisco Hernández wrote, “when the priests wanted to commune with their gods and to receive a message from them, they ate this plant to induce a delirium, during which a thousand visions and satanic hallucinations appeared

to them” (Schultes and Hofmann 1980). But the words of these writers were easily swayed by their own beliefs, and the negative assumptions towards the plant hallucinogens have remained up into the modern culture.

This paper will discuss the methods morning glory was used in the past and present as a key medium of religious ritual. It will describe the plants in botanical detail, including the psychoactive chemical constituents found inside the seeds that produce the desired effects. It will conclude with the modern implications of the plant, its role in future psychotherapy, and how it can remain in positive light amidst the social intolerance for plant teachers in a dominating western society.

THE BOTANICAL PERSPECTIVE

The two plants discussed in this paper are the morning glory vines *Ipomoea violacea* and *Rivea corymbosa*, both of the convolvulacea family, commonly referred to as the morning glory family. It is probable that more plants in convolvulacea contain psychoactive properties (Schultes 1972). Indeed, convolvulacea also includes the Hawaiian Baby Woodrose (*Argyreia nervosa*), which is more potent than both morning glories, but does not appear to have been used traditionally. It will not be discussed in this paper as it does not grow native to Central America and was not used in antiquity for its hallucinogenic effects.

Morning glory is an annual vine native to central Mexico and Central America, and favors a photoperiod of short days and long nights (Mandarino et. al 2005). It has heart shaped leaves of 5-9cm long, 2.5-4.5cm in width (Schultes and Hofmann 1979). Morning glories are highly prized as a cultivar by gardeners all over the world, most likely due to its quick growth and brightly colored flowers which open in the morning. Morning glory grows so quickly that many gardeners consider it an invasive weed.

The chemistry of the morning glory seeds is complex with many psychoactive alkaloids, which are known as the ergot alkaloids, and include the lysergic acid amides: ergine (d-Lysergic acid amide), isoergine (d-Isolysergic acid amide), and lysergic acid hydroxyethylamide. Among these are also, chanoclavine, elymoclavine, lysergol, and ergometrine. The alkaloids are biosynthesized in the leaves but are translocated into a higher concentration in the seeds (Rätsch 2005). Total alkaloid content by weight for *I. violacea* is 0.06% and 0.0012% for *R. corymbosa* (Hofmann 1971). This chemical composition is significant because until their isolation from the seeds in 1960 by Albert Hofmann, the lysergic acid alkaloids had previously only been found in the lower fungi genera *Claviceps*, *Penicillium*, and *Rhizopus*.

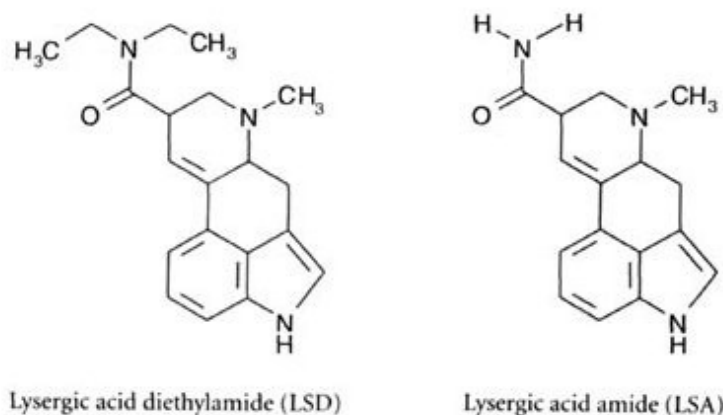


Figure 1. Structural comparison between naturally occurring LSA and semi-synthetic LSD (Rätsch 2005).

The structural similarity between the naturally occurring LSA and the synthetic hallucinogen LSD can be seen in Fig. 1. This small structural difference however, is significant in regard to hallucinogenic activity (Schultes and Hofmann 1980). LSA is less potent, requiring 2 to 5mg for effect, whereas LSD is active at .05 to .2mg. LSD has a more pronounced and specific hallucinogenic activity than LSA which can have effects across spectrum of responses from sedation to highly narcotic, and mildly hallucinogenic to full on hallucinogenic activity and

alteration of perceptions. This change in effect may also be the result of preparations and alkaloid content (Fig. 2).

Alkaloids	<i>Rivea corymbosa</i>	<i>Ipomoea violacea</i>
d-Lysergic acid amid (ergine)	0.0065	0.035
d-Isolysergic acid amide (isoergine)	0.0020	0.005
Chanoclavine	0.0005	0.005
Elymojavine	0.0005	0.005
Lysergol	0.0005	—
Ergometrine	—	0.005
Total alkaloid content	0.012	0.06

Figure 2. Alkaloid contents in % of dried weight of morning glory (Hofmann 1971).

It should be clarified that the pharmacological effects of the alkaloids in morning glory seeds is not the result of ergot poisoning which can occur upon the ingestion of rye infected with the fungus *Claviceps purpurea*. Ergot alkaloids can be separated into two different pharmacological groups: a highly toxic group which cause gangrenous ergotism, and a psychoactive group which cause hallucinogenic effects (Rätsch 2005). The long use of morning glory without outbreaks of ergot poisoning backs up the chemical analysis of the seeds which show either a lack of the toxic ergot alkaloids or insignificant trace amounts.

USE IN ANTIQUITY

“They drink *ololuiqui*, peyote, and a seed that they call *tlitliltzin*.

These are so strong that they deprive them of their senses and they say that one like a little black man appears to them and tells them all they want. Others say that Our Lord appears to them, others the angels. And when they do this, they enter a room and close themselves in and set a guard so that he may hear what they say, and people are not to speak to them until the delirium has left them

because they become like madmen. And then they ask what they have said, and that is what is certain.”

Ruiz de Alarcón wrote this passage in his treatise in 1629 showing that the ritual use of both morning glories was in place prior to Spanish conquest. Alarcón writes in many cases that the Indians revered *ololuiqui* to be a divine thing, including “the excess with which these barbarians venerate this seed is so great that they even, as out of devotion, are accustomed to sweeping and sprinkling water to the places where the bushes that produce it are found.” The shaman involved with the morning glory ritual was known as a *Pahini*, which translates to “medicine drinker” but is specific to drinking a hallucinogenic drink for divination (Andrews and Hassig 1984).

Ololuiqui was banned by the Spanish and the Indians were forced to denounce any idols that were associated with the morning glory seeds. Ruiz de Alarcón himself tells about the arrests he made for the possession of baskets filled with *ololuiqui*. But the Indians had no fear of the Spanish law, and Ruiz tells of a common case "this fear is not of the ministers of justice for the punishment that they deserve but of the *ololuiqui*, or of the deity who they believe lives in it, and they have this respect and veneration for it so firmly rooted that indeed the help of God is needed to rip it out" (Alarcón 1629).

When Alarcón became ill, the Indians around him claimed it was from the *ololuiqui*. But when Alarcón recovered he disrupted a festival by building a bonfire and burning a *fenega* or 2.58 bushels (or 90.815 liters) of seeds and any bushes of morning glory he was able to find. Alarcón believed he was helping the Indians, who were “blind” and “miserable people” and committed “crimes” in their worship of their plant deities. He was destroying not only a medicine and visionary tool, but a large portion of their culture and beliefs. Despite this, the

Indians still chose to worship the divine plant and Alarcón mentions "every day new stumbling blocks in this matter are found" and the ministry was "exceedingly diligent in investigating, extirpating, and punishing these results of the ancient idolatry and cult of the Devil" (Alarcón 1629).

The Aztec's persistence to continue the traditions of their culture is in part contributed to their beliefs about this world. Morning glory was one of the four "great divinatory plants of Mexico," of which, *peyotl* (*Lophophora williamsii*), *picietl* (*Nicotiana rustica*), and *teonanácatl* (*Psilocybe spp.*, *Stropharia spp.*, and *Conocybe spp.*) are the others (Wasson 1963). The plants allowed interaction with the supernatural, and as the supernatural forces were the integral structure of their world, the Indians viewed these plants not just as medicine but divine agents, or mediators to the spirit world.

Aztec medicine can best be viewed as a subset of their religious system, and both are an integral part of the social structure (Andrews and Hassig 1984). Illness were perceived to be caused by gods, deified objects (including *ololuiqui*), or sorcerers. Divination and the use of psychoactive plants allowed the Aztec to discover if gods or a sorcerer were involved. If it was a sorcerer then he would be confronted by the shaman, but if it was a god, then appeasement offerings would be made (Andrews and Hassig 1984). In short, because the illness had a supernatural source, it required a supernatural cure.

RITUAL MODERN USE

Despite centuries of persecution and condemnation of morning glory seeds by the Catholic Church, ritual use of the plant survived and continues to this day in certain areas of Mexico (Fig. 3). In the southern Mexican state Oaxaca, the seeds are used by three groups of people: the Mazatecs, the Chinantecs, and the Zapotecs. Among the Zapotecs, many villages

especially hold the morning glory in high regard.

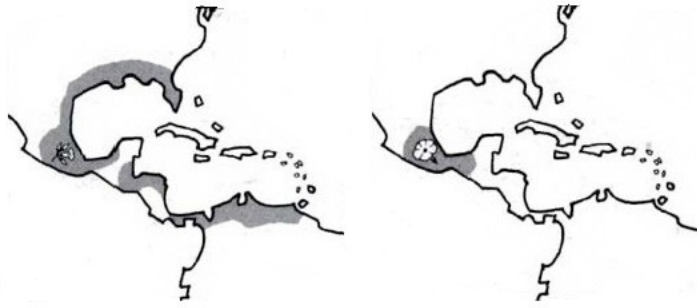


Figure 3. The natural ranges of *Rivea corymbosa* (left) and *Ipomoea violacea* (right)
(Hofmann and Schultes 1979).

In most cases an infusion is made of the seeds by grinding them down and allowing them to soak in water. After a period of time the solid material is filtered out and the liquid is drunk. The amount of seeds can vary but is most often seven or multiples of seven or thirteen (Schultes and Hofmann 1970). The shaman will give the patient the infusion at a secluded quiet place. Unlike the group oriented mushroom ceremonies, morning glory is taken alone so that the patient may “fall into a sleep during which the little ones, the plant children, come and talk” (Schultes and Hofmann 1970). In most cases, a ritually cleansed child serves the drink. The shaman gives a diagnosis based on interpreting what the patient says during the intoxication.

The most obvious change in the ritual from the early days of the Aztec is the syncretization with Catholicism. Modern names include *Semilla de la Virgen* (“seed of the Virgin”) and *Hierba María* (“Mary's herb”) and indicate the reverence which these people have for the plant (Schultes and Hofmann 1979). Peter Furst has mentioned that the names “Mother of Water” or “Mistress of the Waters” which refer to the Virgin Mary may have developed from worship of an unidentified plant called “Mother of the Water” which symbolized a water goddess and was brother to *ololuiqui* (Schultes and Hofmann 1979).

It should be noted however that the dose apparently used by these Indians, which is 7 or

13, suggests that either the effects they are seeking are minimal on purpose, or that the wild *Ipomoea violacea* has a significantly higher concentration of LSA. According to alkaloids extracted by Hofmann (Fig. 2) *I. violacea* contains an average total alkaloid content of 0.06% per gram dry weight, requiring 3-6 grams (approx. 100-300 seeds) for an active dose. A probable explanation for this would be that cultivar morning glory seeds have lost their potency compared to the wild species. Alternatively, it could be that the Zapotecs have over time grown only the most potent of seeds, producing a potent strain. Neither Schultes nor Hofmann seems to discuss this interesting problem in the literature.

MORNING GLORY AND WESTERN MEDICINE

The effect of hallucinogenic psychotherapy on patients suffering from mental disorders like schizophrenia is an area of psychology that has not been studied enough, despite some breakthroughs discovered prior to the scheduling of hallucinogens. LSA's synthetic analogue LSD was investigated for only a short time before laws made it near impossible for independent research to take place. These laws still exist and until a change is made, any research into natural or synthetic psychoactive compounds is severely restricted.

Traditional western medicine advocates mind-altering prescription pharmaceuticals under the pretense that people suffering from mental disorders have unbalanced chemical releases in their brain. Thus daily behavior modifiers are taken. This solution of giving doses of anti-depressants, anti-psychotics, and stimulants on a daily basis promotes and encourages drug addiction and the alteration of human behavior by chemical means. The chronic change of behavior via prescribed drugs has been likened to forced behavioral modification, or mind control, perpetuated by the same source which has prohibited the psychedelic compounds (Schrag 1978). They are also expensive and force patients to pay large amounts of money for

substances they do not need.

Psychedelic compounds offer an alternative but for the most part western medicine and science refuses to take any notice. One of the few groups who advocate psychedelic research is the Multidisciplinary Association for Psychedelic Studies (MAPS). Hallucinogens are not regarded as the cure, but instead they are medicinal aids that when used in the context of psychoanalysis and psychotherapy allow for the patient to restructure his or her mental stability (Schultes and Hofmann 1979). Psychotropic pharmaceuticals are tranquilizers, suppressing the problems, making them appear less serious, or allowing that person to engage in socially acceptable behavior. The psychedelic compounds bring the conflicts to the surface, intensifying the problems so that the patient and the psychotherapist can discover and solve the issue (Schultes and Hofmann 1979).

Despite thousands of years of successful use as medicines, the hallucinogens like *ololuiqui* and *tlililtzin* are shunned by contemporary medical practice. The effects of LSD, a chemical which Hofmann calls “improved modification of the active principle of *ololuiqui*,” is still controversial, despite being recognized as a valuable tool in psychiatry because of its ability to simulate “model psychoses.” This allows scientists to study the biochemical and electrophysiological processes of mental disorders (Hofmann 1971). The drug has allowed some patients to be freed from autistic fixation by isolating and shattering their setting. The effects last for a short time, but long enough for the patient to have meaningful contact with the therapist, which promotes an understanding of the problem.

PLANT TEACHERS IN A MODERN WORLD

“I propose that we should adopt the plant as the organizational model for life in the twenty-first century. This means reaching back in time to models that

were successful fifteen thousand to twenty thousand years ago. When this is done it becomes possible to see plants as food, shelter, clothing, and sources of education and religion.”

The words of ethnobotanical theoretician Terence McKenna provide alternatives to the current ontological position on plants, in particular visionary ones. As can be seen with the pre-Conquest natives of the Americas, the psychoactive plants have had powerful impacts on human societies. McKenna argues the notion that *Homo sapien* has had an evolutionary partnership with the psychoactive plant families, but particularly emphasizes the role of potent hallucinogens on the human consciousness. The assertion requires populations as hunter-gatherers as opposed to agriculture and suggests humans lived in partnership with the natural world and revered plants as most aboriginals of today still do.

This idea of global plant shamanism may not be a hard one to believe and may even implicate hallucinogens as the origins of religion. For hundreds of thousands of years man was the hunter-gatherer, and if the hunter-gatherers and foragers whom remain left on the planet today provide any template, these archaic people would have most certainly used plants to a high degree and have discovered the benefits of certain psychoactive plants. Archeological evidence for the use of an inebriating, stimulant nut called betel nut (*Areca catechu*) can be found in Spirit Cave, Thailand dating to over 10,000 years ago (Fitzpatrick et al. 2003). To think humans just decided to use a new plant ritually enough to effect their social system on a whim ten thousand years ago does not make sense, and by using evolutionary models, which the archeologists pledge by, they must concede that plant use of this type: recreational, ritual, or for deliberate psychoactive benefits, is an evolutionary adaptation coinciding with humans since their most recent morphological changes some 400,000 years ago, and maybe even extending back to the

eras of the hominids.

Betel nut is not a visionary plant however, and it is the visionary plants which can effect populations of people in even more dramatic ways. Artifacts indicating the use of the San Pedro cactus (*Trichocereus pachanoi*) date to at least three thousand years (Schultes 1995). Another cactus, peyote (*Lophophora williamsii*), has been found in archeological sites over four thousand years old (Schultes and Hofmann 1979). Does this represent a new phenomenon of plant use as entheogens? Although not hunter-gatherers, even the empires of the new world still attributed powers to the plant and with the lack of zealot priests demonizing any and all inebriants and practitioners of non-monotheism, shamanism was able to remain in these state level societies. As shamans were around prior to religion (La Barre 1972) it becomes apparent that the use of these plants is most likely not a new phenomena. It is their prohibition in the modern age that is new to humans and as a result has caused problems to not just humans but the Earth itself.

The concept of an illegal natural world is among many things absurd and for entire societies to view plants in such a negative light shows the inherent problems of a dominating agricultural world-view. It is no surprise that in a world where plants are illegal, that global warming, species overexploitation, water and air pollution, and clear cutting of forests exist. The sacred knowledge within these plants may be the catalyst humans need to break out of the horrible advent of agriculture. But this knowledge is doomed to be lost if we continue to deforest and remove Indian populations and lock away the only plants that can show us an answer.

CONCLUSION

Ololuiqui (*Rivea corymbosa*) and *Tlilitzin* (*Ipomoea violacea*) are two morning glory plants which have been used by the Mesoamericans since the time before Spanish conquest and continue to be used by contemporary Indians. The seeds are taken as a divine medicine in the

form of a ritual, the patient taking the infusion by himself, while a shaman diagnoses the problem by interpreting what the patient says during intoxication. The seeds are sanctified and have remained an integral part of the Mesoamerican Indian culture despite the centuries of persecution by Christian missionaries.

The active alkaloids of the seeds are the ergot alkaloids d-lysergic acid amide, or LSA, a chemical which is structurally similar to the well known potent hallucinogen LSD. When ingested visions appear to the patient, ordinary senses are replaced and skewed, and perception of the world is changed. To the Indians this is communion with the gods and a direct link with the deity which dwells inside the serpent vine. Yet despite its medicinal use since antiquity western science ignores these holy seeds and western culture continues to demonize their use. The influences of the 17th century Spanish clerics and the dominating Christian mindset have given rise to prohibition of hallucinogenic plants, and the majority of westerners are still ignorant to the importance of these substances. But as civilizations rise and civilizations fall, the morning glory vines and their counterparts, the psilocybin mushrooms, ayahuasca, yopo, datura, cannabis, San Pedro, and all other psychoactive plants will continue down the evolutionary path, and man will be right there, ready to partake in these foods of the gods.

APPENDIX A

WARNING AND DOSING INFORMATION: Do not confuse *Ipomoea violacea* doses with *Argyreia nervosa* doses. Doses of *Argyreia nervosa* (Hawaiian Baby Woodrose) should never exceed 12 seeds; the dose of 6-8 seeds should be maintained. 10 seeds would be considered a high dose. Many commercial sellers of morning glory treat their seeds with chemicals to discourage eating. By law if the seeds have been treated they must label this on the outside of the seed package.

Ipomoea violacea and its cultivars “Heavenly Blue,” “Pearly Gates,” “Wedding Bells,” and “Flying Saucers” should be dosed at 3-6 grams of dried seeds (approximately 100-300 seeds). Six grams would be equivalent to 6-8 Hawaiian Baby Woodrose seeds.

Morning Glory Preparation 1: Ritual Seed Eating

For *Ipomoea violacea*, take 3 grams of seeds, organic and untreated. If suspected to be treated with pesticides or fungicides wash seeds thoroughly with soap. Place 13 seeds in mouth, chew until chunks become a paste, swallow with small amount of water. Repeat until seeds are gone. For *Argyreia nervosa*, follow the same method except use only 8 seeds total.

Morning Glory Preparation 2: Ritual Infusion

Grind seeds and place in cup filled with pure (distilled) cold water. Do not use tap water as chlorine will destroy desired alkaloids. Allow seeds to soak for six hours, stirring often. Strain out seed material and drink. This method is considered to have a more pronounced narcotic or sedative effect and less hallucinogenic.

Morning Glory Preparation 3: Morning Glory Herb Blends

Morning glory can be used in conjunction with other herbs, often for positive or synergistic effects. Fresh peppermint leaves (*Mentha piperita*) may be chewed, or its essential oil added to the infusion. Ginger (*Zingiber officinale*) can be used in the same fashion. Hawaiian Baby Woodrose is used often with marijuana (*Cannabis sativa*) on the island of Hawaii (Rätsch 2005). Hawaiian Baby Woodrose's intoxicating properties were discovered this way.

Morning Glory Preparation 4: Crude Extracts

Using deionized water, add seeds and tartaric acid to mixture. Or:

Using ethyl alcohol, add seed and let soak for six hours. Evaporate ethyl alcohol.

Morning Glory Preparation 5: LSA Extract

The following preparation requires the use of certain chemical solvents that have been deemed carcinogenic or toxic. It is illegal to possess LSA, a Schedule III chemical.

Following crude extract with ethyl alcohol, add hydrochloric acid (HCL) to form an acidic solution. Wash this solution with a non-polar solvent such as dichloromethane. Basify with sodium hydroxide (NaOH) and extract with dichloromethane and tartaric acid.

APPENDIX B

The active principle of morning glory has been called to solve the problem with the Eleusinian Mysteries of Ancient Greece. In *The Road to Eleusis*, R. Gordon Wasson, Albert Hofmann, and Carl A.P. Ruck investigate this mystery ritual and propose the hypothesis that the hallucinogenic drink was composed in part of *Claviceps purpurea* infected on barley, which grew close to Eleusis in the Rarian plain (Webster 2000). *Claviceps paspali* growing on the wild grass *Paspalum distichum* is also a proposed ingredient as it contains much higher levels of the hallucinogenic ergot alkaloids.

The drink, known as Kykeon, would have been a water-based drink which allows for the extraction of the water soluble psychedelic ergot alkaloids LSA, but would not dissolve the non-polar toxic ergot poisoning alkaloids. The drink was a part of a yearly autumn ritual and came after a nine day fast. The kykeon was mixed in secret and the only known ingredients are barley, mint, and water. However, the water was specifically prepared by an Eleusinian priest known as a Hydranos, and could be a water-extraction of lysergic acid amide (Webster 2000).

LITERATURE CITED

- Alarcón, R. (1629). *Treatise on the Heathen Superstitions and Customs That Today Live Among the Indians Native to this New Spain*. Norman, OK: University of Oklahoma Press.
- Durán, F. (1570). *Book of the Gods and Rites*. Norman, OK: University of Oklahoma Press.
- Fitzpatrick, S. M., Nelson, G. C., & Reeves, R. (2003). The prehistoric chewing of betel nut (*Arecha catechu*) in western Micronesia. *People and Culture in Oceania*, 19, 55-65.
- Hofmann, A. (1971). Teonanácatl and Ololuiqui, two ancient magic drugs of Mexico. *Bulletin on Narcotics*, (1), 3-14.
- Hofmann, A. (1963). The active principles of the seeds of *Rivea corymbosa* and *Ipomoea violacea*. *Botanical Museum Leaflets*, 194-212.
- La Barre, Westron. (1972). Hallucinogens and the shamanic origins of religion. In P. T. Furst (Ed.), *Flesh of the Gods: The Ritual Use of Hallucinogens* (pp. 261-278). Long Grove, IL: Waveland Press, Inc.
- Mandarino, F. et al. (2005). *The Rate of Growth of Ipomoea tricolor Against Different Photoperiods*
- McKenna, T. (1993). *Food of the gods: The search for the original tree of knowledge*. New York, NY: Bantam.
- Rätsch, C. (2005). *The Encyclopedia of Psychoactive Plants*. Rochester, VT: Park Street Press.
- Schultes, R. E., & Hofmann, A. (1979). *Plants of the Gods: Origins of Hallucinogenic Use*. Maidenhead, England: McGraw-Hill.
- Schultes, R. E., & Hofmann, A. (1980). *The Botany and Chemistry of Hallucinogens*. Springfield, IL: Charles C Thomas.
- Schultes, R. E. (1972). An overview of hallucinogens in the western hemisphere. In P. T. Furst (Ed.), *Flesh of the Gods: The Ritual Use of Hallucinogens* (pp. 3-54). Long Grove, IL: Waveland Press, Inc.
- Schultes, R. E. (1941). *A Contribution to Our Knowledge of Rivea Corymbosa, the Narcotic Ololuiqui of the Aztecs*. Cambridge, MA: Botanical Museum of Harvard University.
- Schultes, R. E. (1998). Antiquity of the use of new world hallucinogens. *The Heffter Review of Psychedelic Research* 1:1-7.
- Schrag, P. (1978). *Mind Control*. New York, NY: Pantheon Books.
- Wasson, R. (1963). Notes on the present status of ololuihqui and the other hallucinogens of Mexico. *Botanical Museum Leaflets*. Harvard University, 20(6), 161-212.
- Webster, Peter. (2000). Mixing the Kykeon. Eleusis: *Journal of Psychoactive Plants and Compounds*. New Series 4.