

The Mesoamerican Use of Cycads as Food, Medicine and Ritual

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Cycads have been in use by Mesoamerican cultures for at least 6000 years but misconceptions and lack of attention to cycads gave rise to a proliferation of false assumptions about them. Cycads extensively studied by botanists and new species appearing regularly in the literature contrasts with the relative lack of ethnobotanical information. At best the uses of leaves and plants to decorate altars during religious festivities and as a minor food source and at worst their use as food is often assumed to cause long-term neurological damage to humans. Attempts to establish a causal link between cycad consumption and neurodegenerative diseases such as ALS-PDC in Guam are inconclusive [1,2]. Notwithstanding, recent research has pointed to lead poisoning through steeping of the seeds in water-filled-lead-painted oil drums in the 1940s [3].

Cycad-consuming peoples universally know that cycads are acutely toxic and can cause serious sickness and death, and thus make efforts to remove or render their toxins harmless before consumption. Nevertheless, the idea that cycads cause long-term neurodegeneration appears to be the primary reason for a number of ethnobotanical studies after the 1960s. Simply put, the dominant assumption is that humans consume cycads only as a last resort, usually as a famine food, because they are so toxic, and therefore they can never have been important in human diets [4] although this is not entirely true.

In the Pamería region of northeastern Mexico cycads are used as food and for ceremonial purposes, Seeds, with sarcotesta removed, are cut into chunks.

The seeds are washed in ash and then boiled, the process repeated several times; the detoxified seeds are then ground into flour to make dough for tamales and tortillas. Yet in the neighboring Teneek community the use of cycads as a food is shunned as this community has used the cycads in the past as a famine food and reminds them of great hardship and sadness. *Dioon edule* or 'chamal' apparently has entheogenic properties and is used in Teneek shamanism, although so far no alkaloids have been isolated. In Oaxaca the seeds of the 'palma de chicalite' (*Dioon spinulosum*) is ground, after detoxifying, to make flour for tortillas. This is also the case for seeds of *Dioon mejiae* known as 'tiusinte' in the Olancho region of Honduras where the seeds are ground to make dough for 'rosquetes' and breads [3]. In the central depression of Chiapas the cycad *Dioon merolae* commonly known as 'espadaña' is sought after for its leaves that are used to decorate altars in the town of Suchiapa during the Santa Cruz (Holy Cross) celebrations ending April till the 3rd of May. Processions go into the forests where *D. merolae* grows and leaves are harvested, only a certain number of leaves are taken from each plant with precautions to not damage the cycad, apparently this pruning of the cycads is beneficial giving rise to their production of new leaf flushes. This is done with much pomp and ceremony with stops called 'topadas' at certain places during the harvesting, usually large trees, to recite prayers in the Chiapanec language with the burning of copal incense, drumming and the drinking of pozol which is a drought of fermented maize and cocoa not unlike the Amazonian chicha [5].

In Sonora *Dioon sonorensis* along with *Dasyllirion* sp is used for the fabrication of alcohol that has led to the decimation of whole populations of the cycad in the Bacanora region. The mucilage of the cycad is also used for the treatment of articulation pains in this

region. In central Veracruz in the Xalapa region *Ceratozamia tenuis* seeds are ground and mixed with jam or marmalade and used as an insecticide against flies. Stems of *Zamia loddigesii* are used in Tabasco for disinfection of the umbilical chord during childbirth [6].

Apart from the ornamental use of cycads to decorate public gardens and municipal buildings, the seeds are used to make toys such as bullroarers, the sclerotesta of *D. mejiae* seed in Honduras is emptied and perforated to make pin-and-target toys and whistles, and the seeds of *D. spinulosum* to make 'zumbadores' or bullroarers in Oaxaca.

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