

Natural and Artificial Palm Oases in the Southwestern USA and Northwestern Mexico

Dennis V. Johnson
Palm Tree Resources Worldwide
3726 Middlebrook Ave
Cincinnati OH 45208 USA
Email: djohn37@aol.com

Abstract

Oases supporting palm populations represent attractive scenic aspects of the desert landscapes in California and Arizona in the southwestern United States, and in Baja California and Sonora in northeastern Mexico. In the USA, about 150 natural palm oases exist, supporting populations of the California fan palm, *Washingtonia filifera*. Palm Canyon near Palm Springs, California is the largest such oasis. Palm oases in Mexico also are numerous, but reflect greater diversity with four additional native palm species present: Mexican blue palm (*Brahea armata*); San José palm (*B. brandegeei*); Sonoran palmetto (*Sabal uresana*) and the Mexican fan palm (*Washingtonia robusta*). Nacapule Canyon, Sonora, for example, has three native genera. The date palm (*Phoenix dactylifera*) was introduced to Baja California in the mid 18th Century and became naturalized in several oases where it today coexists with native palms. Mulegé is an example of this situation. When date palm offshoots were introduced to the southwestern United States in the late 19th and early 20th centuries, they were planted in newly-created artificial oases where no native palms had existed previously. Indio, California is representative of an artificial palm oasis and is the historic home of the US date industry. This paper discusses the three types of palm oases in terms of their recreational and commercial roles.

Introduction

Oases possess an almost magical quality in the popular imagination, largely derived from their depictions in legends, adventure stories and films. In the age of modern tourism, oases are often destinations for visitors who wish to relax and enjoy the comforts of luxurious desert resorts with their salubrious climatic conditions. But some oases also represent functioning agricultural production systems; moreover, small isolated undeveloped oases serve as natural habitat for native plants and animals. The latter type is of particular interest to ecotourists who want to observe nature in a pristine state.

Palms are the hallmark species of many oases, and come to mind when the word “oasis” is mentioned. On a global scale, however, there are many more oases without palms than with them. For the purposes of this paper, oases with native or introduced palms are used to illustrate different kinds of oases, with examples drawn from the southwestern United States and northwestern Mexico.

Oasis Typology

Three basic types of palm oases are found in the region studied. The first type consists of natural oases which have palms as part of their vegetative cover. Often, the palms may be the dominant tree, providing shaded habitat for other desert species. Type two is quite similar to the first type, except with the addition of introduced naturalized exotic palms which are successfully competing with the native palms. Date palm is the exotic species in the locations discussed in this paper. Given the limited water resources in oases, naturalized date palms would tend to crowd out and diminish the natural populations of local native palms. However, in the geographic area of this study, it does not appear that the date palm is threatening any native palm species with local extinction.

Artificial oases with only date palms constitute the third basic type. The term “artificial oasis,” as used here, refers to the development of water resources to create an oasis where none existed. Water supplies may originate from the enhancement of the natural surface flow of a spring, often associated with the construction of a small dam and reservoir, local groundwater sources pumped to the surface by wells or water brought in by means of pipes, ditches or canals from an external source. In the first case, an unmodified location may have present some natural vegetation fed by a small spring or subterranean ground water source, but where the water resource is insufficient to support the larger vegetative growth characteristic of a true oasis.

All of the palm oases discussed in this article have been visited by the author. The accounts represent a combination of personal observations and of information taken from published literature.

Natural Palm Oases

About 150 natural palm oases can be found in California, Arizona and Nevada of the southwestern United States (Cornett 1989). The precise number existing in the Mexican states of Baja California, Baja California Sur and Sonora is not known, but could be approximately 100. A biological study of the Baja California Peninsula included surveys of some of the palm oases (Arriago and Rodríguez-Estrella 1997). Altogether, these natural palm oases extend from 35° to 23° North latitude and occur at elevations from below sea level to 1,200 meters.

Five native palms species have been recorded in these oases: Mexican blue palm (*Brahea armata*) and San José palm (*B. brandegeei*); Sonoran palmetto (*Sabal uresana*); California fan palm (*Washingtonia filifera*) and Mexican fan palm (*W. robusta*) (Henderson, Galeano and Bernal 1995). All five species occur in the Mexican palm oases; only *Washingtonia filifera* grows naturally in the desert palm oasis of the United States. Representations of natural palm oases can be found in the following four locations.

Palm Canyon, California 33° 50' N. Lat. Easily accessible and located just a few kilometers south of the thriving desert resort city of Palm Springs, Palm Canyon is a wonderful natural area. It represents the largest palm oasis in the United States and is largely within the reservation of the Mission Band of Native American Cahuilla Indians and is fully protected. Palm Canyon is considered to be a sacred place by the Cahuilla.

The footprint of development is light, consisting of a small visitor center and shop, hiking trails and a few picnic tables for the ecotourists.

About 2,500 adult California fan palms occur in Palm Canyon, with an excellent representation of different age classes; the sign of a healthy natural population. The palms are sustained by an intermittent stream and groundwater. Adhering leaf base along with an abundance of very dry litter beneath the palms, combined with high temperatures and low humidity, create ideal conditions for fires within the palm groves. Fires may occur from natural causes or may be started accidentally or intentionally set by vandals. In the past, fires were started by Native Americans to clear the canyon floor. Fortunately, the palms lose only their leaves in a fire and recover quickly; in fact, the palms are not just tolerant of a quick scorching but appear to be stimulated by a fire to produce a bumper crop of fruit the following year. Palm Canyon burned in 1980 but recovered fully within a few years of the event. In the area of this study, oases of *Washingtonia filifera* are most prone to fire (Cornett et al 1986; Cornett 1989; Henderson 1951).

Guadalupe Canyon, Baja California 32° 5' N. Lat. About 85 kilometers southwest of the busy agricultural center of Mexicali, over rough and dusty roads, is the palm oasis of Guadalupe Canyon. Nestled in the foothills of the mountain range forming the backbone of the Baja California Peninsula, the Canyon lies within the boundaries of the Constitution of 1857 National Park. A perennial stream flows down the boulder-filled canyon feeding an oasis which includes populations of the Mexican blue palm and the California fan palm. The total number of palms in the Canyon is about 800, about 85 percent of them are California fan palms (Cornett et al 1986; Henderson 1971).

Visitor facilities at Guadalupe Canyon are rustic. A leaseholder manages the site and imposes fees. Campsites are available, there are hot springs and a bathing pool in the stream and a small store carries essential items. The number of visitors is restricted by road conditions which require a sturdy vehicle. Palm populations appear to be stable and further development controlled by National Park regulations.

Cataviña, Baja California 29° 44' N. Lat. The main highway down the Baja California Peninsula passes through the small village of Cataviña, located about 480 kilometers below the international border. The village consists of a few stores, a gas station and a hotel which provide services to travelers. Cataviña is located within the Central Desert Natural Area, which imposes restrictions on development.

An intermittent stream supports oasis plant species in the valley which is surrounded by the striking scenery of the Central Desert. Only a few dozen palms in total are present, but they represent three different species: the Mexican blue palm (*Brahea armata*) and both species of *Washingtonia* (Cornett 1987). The palms do not appear to be under any threat from the ranching activities. Cataviña's limited water resources are its best protection.

Nacapule Canyon, Sonora 27° 56' N. Lat. Palm oases are not common in Sonora on the Mexican mainland, but narrow, steep and rocky Nacapule Canyon makes up for the fewer numbers by its palm diversity. Located some 16 kilometers west of the port city of Guaymas, the canyon faces eastward away from the Gulf of California. In a land area of a few square kilometers the Mexican blue palm (*Brahea armata*), Sonoran palmetto (*Sabal uresana*) and the Mexican fan palm (*Washingtonia robusta*) are found. The occurrence of three native palm genera in such a small area makes Nacapule Canyon unique.

An intermittent stream waters the canyon and natural rock fall has created a pond at the head of the valley. Apart from narrow footpaths, Nacapule Canyon is in a pristine state and a delight to visit for the nature tourist. The Canyon is protected because of its location within the Cajon del Diablo Biosphere Reserve (Johnson and Hodel 2004).

Natural and Introduced Palm Oases

In the following examples from Baja California Sur, naturalized date palms and native palms are growing together in the oases. Spanish missionaries brought in date palm seeds in the 1750s. The history of the Spanish missions is detailed and illustrated in an exquisite book by Vernon (2002). Local information is provided by a Baja California travel guide (ACSC 2001). The date palm is one of several crops introduced during that period when proselytizing missions were established in Baja California. Little if any attention has been given to the agricultural development of date palms in Baja. No vegetative propagation has ever been practiced with the seedling dates in the oases; fruits are harvested, for local human consumption and eaten by grazing animals. Because of suckering habit of the date palm it appears to have a competitive advantage over the native *Brahea* and *Washingtonia* palms. In the five examples described below, date palms predominate over the native palms, but there does not appear to be any threat of local extinction of the native species. These oases are highly scenic and strikingly beautiful sites.

San Ignacio 27° 17' N. Lat. This charming inland village of about 2,000 people occupies the center of the largest date palm oasis in Baja California. Nixon (1953) estimated that there were 50,000 palms at this location. Originally founded in 1786, the restored mission church, which includes a public museum, faces the town square; around it are shops and restaurants, catering to the needs of both resident and tourist alike. Other tourist facilities are two hotels and several campgrounds. The date groves in San Ignacio, and agriculture there in general, do not appear to be either well maintained or very productive; a statement that could be applied to all five oases, with few exceptions. Nevertheless, San Ignacio represents a classic example of an oasis, surrounded as it is by true desert. The San Ignacio River has been dammed, creating an attractive water body rimmed with date palms; it also serves to keep the aquifer charged to sustain the oasis. There are no formal irrigation works.

Both species of *Washingtonia* palms are native here and persist, especially at the edges of the date palm groves. In addition to the limits placed on future development by finite water resources, San Ignacio lies within the El Vizcaíno Biosphere Reserve which affords some protection to the surrounding landscape and indirectly to the village and its date palm groves.

Mulegé 26° 53' N. Lat. Located at the mouth of the Mulegé River on the Gulf of California, Mulegé's chief economic activities are associated with agriculture, fishing and tourism. Several small hotels and one resort hotel serve the visiting tourists, who are mostly from the United States. From the restored mission church hill site, there is an overlook of the beautiful palm-filled valley. Mulegé even has a small museum housed in a former prison. The town population is about 5,000. Old seedling date groves crowd the valley and are either unmanaged or given only minimal care, except for the harvest of some of the fruit crop. About 15,000 date palms are found in Mulegé (Nixon 1953).

In addition to the date palms, there are healthy coexisting populations of *Washingtonia robusta*. Possibly a native species of *Brahea* persists. Land in the valley is either in private hands or owned collectively; there are no legal measures protecting the date palm groves. As part of a public works project to straighten the river's lower course to ameliorate the occasional flooding that occurs, numerous date palms have been removed. Future population growth of the town and expansion of agricultural activities will very likely be at the expense of the date palms. This is an unfortunate prospect because the date palm groves give Mulegé its scenic quality.

Loreto 26° 01' N. Lat. Similar to Mulegé in terms of its site on the Gulf of California and its economy, Loreto has about twice the human population (9,000). Tourism is a dominant activity and resort hotels, with deep sea fishing and scuba diving being popular attractions, and a number of restaurants. Importantly, Loreto has an international airport. It is the oldest Spanish settlement in Baja California, founded in 1697. The city center has a lovely church, a historical museum and other public buildings with charming colonial architecture.

Scattered survivors of the once much more extensive date palm groves still give the city an attractive look. Nixon (1953) estimated that Loreto had about 15,000 date palms, but that number has been reduced significantly. On the floodplain at the mouth of the intermittent Loreto River, small stands of date palms can be seen. A number of the date palms removed because of urbanization have been transplanted as street trees on a broad avenue along the bay. Some date fruits are harvested from the old stands, but the trees are clearly neglected. A few remaining native *Washingtonia robusta* palms are found mixed with the date palms. It is hoped that future urban expansion will incorporate rather than eliminate the current palm populations so as to maintain Loreto's attractive palm landscape.

Comondú 26° 03' N. Lat. Situated inland within an isolated rather narrow mountain valley sloping to the Pacific Ocean, is the agricultural village of Comondú. With an intermittent stream and reliable groundwater resources, the valley supports a mixed population of date palms and the Mexican fan palm, as well as other agriculture including some citrus. Here the native palm populations in the upper portion of the valley outnumber the date palms. Access from the east, over the mountain spine of Baja California, is by a rocky rough road, but the view of the green valley from on high is worth the drive. This village of about 100 people is rustic, having only a single small store and a partially-restored mission chapel. A narrow paved road links the village to a highway along the west coast. No tourist facilities exist.

The Comondú palm oasis lands, private and communal, are devoted to subsistence and commercial agriculture. In the mid 20th Century, Nixon (1953) estimated that 20,000 date palms grew in the valley. Date palm fruits are harvested but the trees do not appear to be cared for. The verdant palm groves are protected only by isolation and the limited water resources which preclude much in the way of development.

La Purísima 26° 11' N. Lat. The final example of an oasis with native and date palms is the settlement of La Purísima. This agricultural town of about 1,200 population shares its name with the stream which provides the water resources for the irrigation systems of this broad, west-facing valley about 25 kilometers from the Pacific Ocean. La Purísima, and the village of San Isidro 5 kilometers up the valley, represent the focus of the most productive palm oasis in all of Baja California. Here some of the date palms

receive a measure of management and this area is reported to have the most commercialized date fruit production. Some 15,000 date palms are found in La Purísima (Nixon 1953). Other crops of the valley include citrus, grapes and vegetables. A good paved highway leading south allows quick and efficient shipment of agricultural production.

Some of the date groves are managed for fruit production, although many are not. There is a good chance that agricultural expansion in the valley will entail removal of date palms, since they occupy productive flat land. Apparently, most of the land is in private ownership. A fair number of Mexican fan palms are scattered over the valley.

The La Purísima valley's patches of irrigated agriculture and the surrounding stark rocky elevations make it highly scenic. Despite the attractive desert landscape and good road access, this valley receives few visitors and there are no tourist facilities, not even a local restaurant. Like many such agricultural communities it does well with a gas station and general store. The main problem in terms of visitors is that La Purísima is rather remote and at the end of the paved road on the west side of the peninsula, hence has no pass-through traffic.

Artificial Oases of Date Palms

Date palms are under cultivation commercially in the states of California and Arizona in locations where water resources first had to be developed to permit agriculture of any kind. Local groundwater sources as well as irrigation water delivered through canals or a combination of the two have created these productive agricultural oases. According to a recent study by Hodel and Johnson (2007), California has 2,145 bearing hectares of date palms; Arizona has an estimated 200 bearing and nearly 300 nonbearing hectares, the latter reflecting new plantings. Typically date palms are grown in pure stands.

As examples of this type of palm oasis, three locations in the southwestern United States are described below. Two regions represent the majority of commercial date fruit production in the country: Indio, California and Bard, California/Yuma, Arizona. China Ranch, California, the third location, was chosen because it is a successful small-scale enterprise.

Indio, California 33° 43' N. Lat. Commercial date growing in the United States had its beginnings in the Indio area in the early 19th Century. Water resources developed both from subsurface sources and canals built to deliver water from the Colorado River to the east, made possible the establishment of agricultural enterprises. Selected offshoots of superior date varieties were imported from North Africa and the Middle East and formed the basis for the new agroindustry. Currently there are about 1,600 hectares of dates grown in the area, using flood irrigation and by drip or microsprinklers. Other irrigated crops are grown as well, but it is the date palm groves which give the landscape a distinctive signature.

Small and large date processing facilities are scattered over the Indio area; there are also two roadside date shops where visitors can purchase date fruits and snacks, including Indio's famous date milk shake. High quality dates are sold by mail order, over the internet and at farmers' markets in larger cities to the west.

Indio is an oasis city with a human population of some 80,000. Its economy is dominated by agriculture and supported to an extent by tourism, mostly in the cooler winter season. New housing tracts have been constructed for new permanent and seasonal residents, often on the site of former date groves, with new replacement groves being developed further to the south. Currently under development is an added attraction for visitors in the form of a museum devoted to the local history of the date industry.

Bard, California/Yuma Arizona 32° 40' N. Lat. This date palm oasis is separated into two parts, divided by the lower course of the Colorado River. Bard, to the west, is an area of irrigated agriculture devoted primarily to the date palm, with the palms occupying about 400 hectares. On farms with heavy soil, flood irrigation is the practice; in areas of sandy soils, drip or microsprinkler systems are the rule. Bard has no settlement or commerce apart from a few small retail date shops within the processing plants on the date farms.

Yuma, to the east, is a city of about 90,000 and is the administrative center of the county. Like Indio, Yuma's agriculture and winter tourism are mainstays of the local economy. An estimated 500 hectares of bearing and new date palm plantings are found in Yuma, most of them located south of the city. Virtually all of Arizona's date fruit production originates in the Yuma area.

Date growing in this desert oasis area is complex because some large growers have producing groves on both sides of the river. Moreover, dates harvested in California may go to a processing facility in Yuma, or vice versa. Nearly 100 percent of the dates grown in Bard/Yuma are of the elite Medjool variety.

Date palms dominate the landscape in the Bard area, and south of Yuma in the areas of new plantations. In the city of Yuma itself, there is only a single commercial date grove. The University of Arizona has an agricultural station located a few kilometers south of Yuma which includes date palms in its research activities.

China Ranch, California 35° 51' N. Lat. Located at about 400 meters elevation in the Mojave Desert, China Ranch occupies the lower reaches of a canyon with limited water resources. The location has a long and colorful history which began with providing necessities to travelers passing through and to nearby mining communities. In the 1920s, date palms were planted from seed and their natural descendants persist. Late in the 20th Century, China Ranch was developed for date fruit production and offshoots of improved were brought in. Water resources were enhanced by constructing a dam and reservoir to capture the stream flow and distribute the water by gravity feed through ditches to the date grove.

At nearly 36° North latitude, China Ranch is the northernmost point of commercial date growing in the United States. This does not represent the northern limit of commercial date growing, however; in Europe dates are produced in Elche, Spain at 38° 17' North latitude.

A fruit processing facility, and date shop and bakery to serve visitors have been built, and dates sold by mail order and over the internet. China Ranch markets Medjool and a few other improved fruit varieties, as well as some fruit from the better seedling date palms. There are other examples of small-scale date growing enterprises farther south in California and Arizona; nearly all are family run.

Conclusion

Natural palm oases, on a geologic time scale, are ephemeral desert landscape features and are very sensitive to environmental changes that impact water sources, be they surface or subsurface. Global climate change poses a major threat. Small natural palm oases cannot support much in the way of development, but are appealing to nature-loving tourists and at the same time continue to function as refugia for rare plant and animal species. Slightly larger oases with greater water resources may support small-scale agricultural activities and modest tourism facilities.

Larger artificial palm oases typically depend upon local and external water sources to sustain agricultural production and associated urban centers. In the Coachella Valley, where Indio is located, groundwater resources are being overexploited and the water table is dropping steadily, putting ever-increasing pressure on exterior sources of water. This situation represents the classic example of the growth in size of a desert oasis that is outstripping the reliable water resources. Clearly, there must be some human population growth limits placed upon desert oases if they are to be sustainable. In addition, water use must be regulated, either directly through rules of use, or indirectly by consumer cost structures that promote water conservation. An integrative management approach for palm oases, and any oasis for that matter, is essential if they are to persist and be enjoyed by future generations.

References Cited

- ACSC. 2001. Mexico's Baja California. Automobile Club of Southern California.
- Arriaga, L. and R. Rodríguez-Estrella (eds.). 1997. Los oasis de la península de Baja California. Pub. 13, Centro de Investigaciones Biológicas del Noroeste, La Paz.
- Cornett, J.W. 1987. Three palm species at Cataviña. *Principes* 31(1):12-13.
- Cornett, J.W. 1989. Desert palm oasis. Palm Springs Desert Museum, Palm Springs CA.
- Cornett, J.W., T. Glenn and J.M. Stewart. 1986. The largest desert fan palm oasis. *Principes* 30(2):82-84.
- Henderson, A., G. Galeano and R. Bernal. 1995. Field Guide to the Palms of the Americas. Princeton University Press, Princeton NJ.
- Henderson, R. 1951. Wild palms of the California desert. *Desert Magazine*, Palm Springs CA.
- Henderson, R. 1971. Palm canyons of Baja California. La Siesta Press, Glendale CA.
- Hodel, D.R. and D. Johnson, D. 2007. Imported and American varieties of dates in the United States. Pub. 3498. University of California Agriculture and Natural Resources.
- Johnson, D. and D.R. Hodel. 2004. Nacapule Canyon, Sonora, Mexico: a unique site of palm diversity. *The Palm Journal* 178:37-38.
- Nixon, R.W. 1953. North America's oldest date gardens. *Pacific Discovery* 6(1):18-24.
- Vernon, E.W. 2002. The Spanish missions of Baja California. Viejo Press, Santa Barbara CA.