Unique Setting of Roystonea in the Bahamas

WILLIAM T. GILLIS
Biology Department, Hope College, Holland, MI 49423

Earlier, Gillis, Proctor, and Avery (1975) reported *Roystonea* for the first time in the Bahama Islands. At that time the royal palms had been seen by the writers only from the air. A trek back through the bush to the royal palm site by Mr. Donald Buden had netted some fruits from the trees and had confirmed their identity.

Under the auspices of an expedition from the Carnegie Museum of Natural History, the author has had the opportunity to visit the royal palms and examine their habitat on Little Inagua Island. The purpose of this paper is to describe their setting, which appears to be unique in the Bahamas.

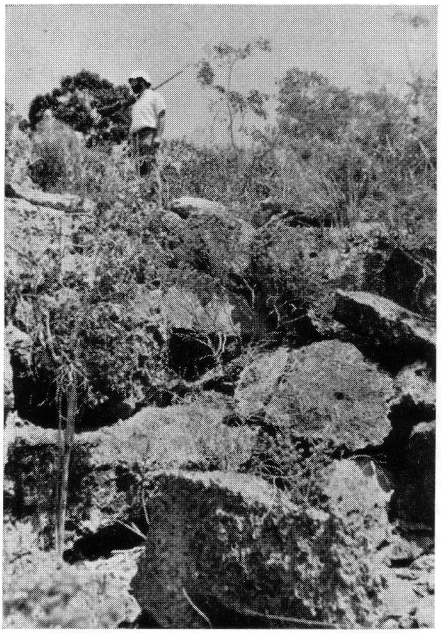
During a visit to Little Inagua by boat in mid-March 1976, Mr. Harry Clench, Mr. Arthur Bianculli, and I hiked back from the coast to visit the royal palms. We were fortunate in finding the trail through the bush which Mr. Buden had cut fourteen months previously, enabling us to make the trip in four hours, whereas it had taken Buden seven half-days to cut the trail initially.

The royals are found in five or six giant sinkholes, all in the northwest quadrant of the island, all about 2.5–3.0 miles south of the north coast and about the same distance from the west shore. There is no anchorage on the north or east coasts, hence, any assault on the island has to be made from the southwest or west shore. The path which we followed enters from the west. It meanders somewhat, following burro trails for the most part, and covers an estimated five miles.

From the coast one climbs a low foredune. Immediately behind the dune is a rocky swale, dominated by thatch palms (*Coccothrinax inaguensis* and *Thrinax morrisii*), manchineel (*Hippomane mancinella*), various cacti (*Melocactus intortus*, *Opuntia nashii*, etc.), and typical scrub of the dry, southeast Bahamas. (It is estimated that less than 25 inches of rain falls on Little Inagua per year, but there are no rain gauges for accurate measurement.) There is no soil development in this swale, all plants growing in solid coral limestone.

Behind the swale is a curious ridge of coral boulders that forms the face of an undulating plateau that comprises the bulk of the interior of Little Inagua (Fig. 1). Whether the boulders have eroded in place on the face of the plateau (the most logical explanation) or were piled there by fierce storms in the past (the explanation which best fits their appearance) is unknown. This ridge, however, is more or less continuous along the entire west side of the island and to a large extent, the south and north coasts as well. We have not been able to visit the east shore.

Mounting the ridge, which is six to ten meters in height, one emerges onto the central plateau. The vegetation is all mixed scrub over head height with an occasional mahogany (*Swietenia mahagoni*) or poison wood (*Metopium*



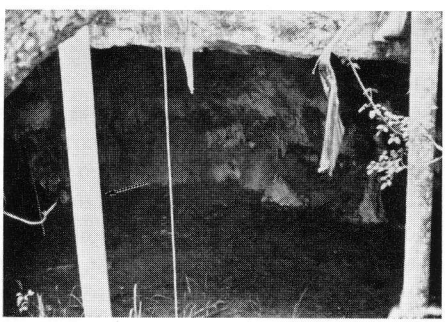
1. View of 10-meter boulder facing of plateau, Little Inagua. Mr. Arthur Bianculli, 1.75 meters tall, is the scale.

2. Royal palms shown towering above sinkhole and surrounding vegetation.

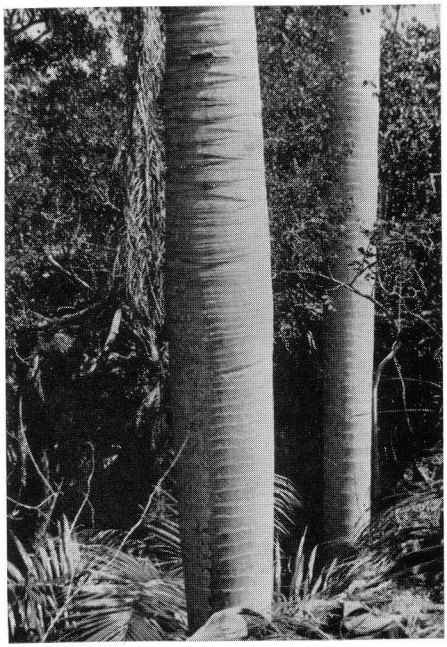
toxiferum) projecting above the rest. It was by climbing to the top of an occasional emergent that we could see the royal palms, even from the edge of the plateau. The royals tower as much as 12–13 meters above the surrounding terrain, so it is no small wonder that they can be seen from such a distance (Fig. 2).

The scrub is dense, dominated by poison wood, boxwood (*Buxus bahamensis*), grandfather cactus or dildo cactus (*Cereus bahamensis*), pigeon plum (*Coccoloba diversifolia*), *Caesalpinia bahamensis*, *Vernonia arbuscula*, *Bursera inaguensis*, *Lantana involucrata*, and *Amyris elemifera*. The final half-mile was the roughest. The scrub became more dense, the dogtooth limestone sharper and more uneven, and the prickly vine (*Oplonia spinosa*) increased markedly. It was almost as if nature had intended to protect the royal palms from intrusion by the infidel, man. At last we reached the amazing sinkholes in which the royals live.

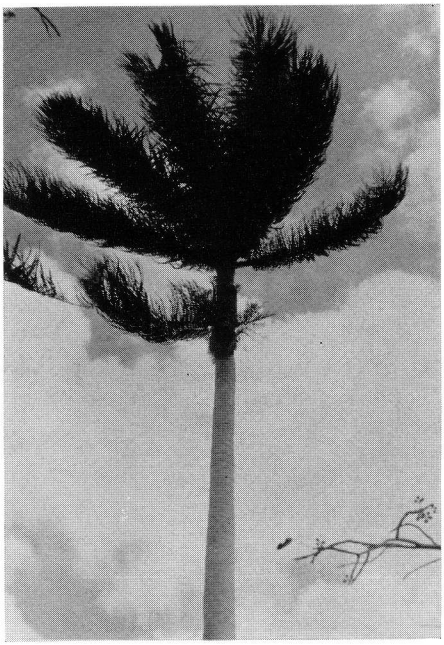
The sinkhole which we visited is about 25 meters long and 10 meters wide. It is also about 8–10 meters deep (Figs. 3 and 4). The royals are rooted in the bottom and yet, still



3. Interior of sinkhole showing organic soil and standing water. Arrow indicates royal palm trunk. To the right of the trunk is an aerial root of *Ficus*.



4. *Roystonea hispaniolana* as seen from edge of sinkhole. Note juvenile royal palm at bottom of hole.



5. *Roystonea hispaniolana* growing from sinkhole on Little Inagua.

tower 12–13 meters out of the holes. The hole we examined had six mature royals in it and one juvenile (about 5 meters tall), plus several mahoganies. The bottom was covered with a layer of organic matter and some mineral soil, a unique feature for the island. Generally moist, the soil supports a stand of sawgrass (*Cladium jamaicense*) and wild coffee (*Psychotria ligustrifolia*) in addition to the tree species. There is also potable standing water beneath the overhanging walls and roof of the sinkhole, another unique feature for the island. Other than a few blue holes seen on aerial photographs, we know of no fresh standing water on this dry island.

The margins of the sinkholes are undercut with shallow caves. On the top edges of the holes are a number of short-leaved figs (*Ficus citrifolia*) whose aerial roots hang down into the hole, often becoming rooted in the moist medium for growth at the bottom. As a consequence the figs are healthier and more robust than the surrounding vegetation which has not tapped into the abundant water supply in the sinkhole. We judge this water to be entirely from rainfall and not from any springs.

How did the palms reach Little Inagua? They appear to be royals of a Hispaniolan affinity, *Roystonea hispaniolana* L. H. Bailey (see Fig. 5), rather than of a Cuban affinity as suggested earlier (Gillis *et al.*, 1975). In either case their disseminules must have been transported to Little Inagua by birds. Such birds—long-distance fliers —may have visited these sinkholes specifically to obtain water. Failing that, the seeds, probably after passing through the gut of the birds, may have been broadcast over the landscape

6. Royal palm seen from 200 meters distant through the scrub vegetation.

7. Vista across Little Inagua landscape as seen from top of mahogany tree. Royal palms indicated by arrow in distance.

of eastern Inagua and Little Inagua through the centuries, finding suitable site for growth only in the bottom of the sinkholes. As would be expected, some of the royal palm sinkholes also have *Sabal* palms in them; the sabals probably arrived in the same manner as the royals. The oldest of the royals appears to be more than a century old. It is possible that a single successful introduction may account for all the royals present today; of course, repeated introductions may have taken place.

One might enquire if the source of the palms might have been man's introduction. There is no evidence of man's prior subsistence on Little Inagua, although men from former nearby settlements on adjacent Inagua were known to have introduced the burros which we heard and saw droppings of (but never saw in the flesh). They also introduced boars which have naturalized on the island, and they may have introduced goats. Unless primitive man had stumbled on the royal palm sinkholes or others like them, he would have had no source of fresh water. There is no evidence of habitation near the holes. Local lore in Matthew Town, the only extant settlement on Great Inagua, about 60 air miles southwest of Little Inagua, suggests that there are royal palms in similar habitats on Great Inagua. We have flown the length of Great Inagua several times searching for such phenomena, but have not seen them. Perhaps the local folk have stands of buccaneer palm (*Pseudophoenix sargentii* subsp. *saonae*) in mind. But then, the eastern half of Inagua is as much a mystery as most of Little Inagua, there having been no naturalist into the middle of the island, save for along one seven-mile stretch of recently constructed road east of the lake (called Lake Windsor on old maps and Lake Rosa on contemporary ones) that is the home of many thousand flamingoes.

We mused earlier (Gillis *et al.*, 1975) as to the reason why these palms had not been discovered earlier. It is now obvious. Despite their imposing, towering height, the surrounding vegetation (over head height) effectively blocks the view of the royals until one is but 200 meters or so from them (Fig. 6). From the shore, the ridge and vegetation block the view. Only by climbing a tree on the plateau, and then only within six miles or so from the palms, would it be likely that they could be picked out against the background. From the west they are silhouetted not against the sky, but against a hill in the background where the palm fronds are seen against a background of green scrub (Fig. 7). Had Nash and Taylor, or Percy Wilson, the earlier botanist visitors to Little Inagua, been looking specifically for the royals, they could have seen them from a tree top. Had they been lulled into the belief that the plateau was uniform in its vegetation mixture, they would never have thought to look for this palm treasure against the sky, not having found it on any other island.

So intriguing is this feature and, indeed, the entire island, that we shall propose preservation of it to the Bahamas National Trust. Despite the fact fact that we saw no butterflies for lepidopterist Harry Clench once we left the coastal region, he felt the trek to the royals was the highlight of our five-week trip through the Bahamas. Seeing the spectacular royals rising majestically out of their subterranean home was indeed worth the arduous hike through the bush and thorny vines.

Acknowledgments

Photographs contained herein were processed by Mr. John Lupo of the Biological Laboratories of Harvard University from colored slides taken by the author. I am indebted to Dr. Mary Clench, scientific leader of the expedition to the Bahamas from the Carnegie Museum, for including Little Inagua on the itinerary. Sponsors of the expedition include the World Wildlife Fund and the M. Graham Netting Fund of the Carnegie Museum. Determination of the species as *R. hispaniolana* was made by Dr. Robert W. Read, whose assistance in this matter is greatly appreciated.

Literature Cited

Gillis, William T., George R. Proctor, and George N. Avery. 1975. Indigenous royal palms in the Bahamas. Principes 19: 104–105.

Nash, George V. 1905. Botanical exploration of the Inaguas, Bahamas. Journal of the New York Botanical Garden 6: 1–19.