

How Botanic Gardens can play a role in aiding flora and fauna in areas altered by mans growing population? - A short talk with special emphasis on the ecological concept of carrying capacity.

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A botanic garden with life is not only more enjoyable to visitors but sparks interest in adults and children alike whose views are vital to our environment's future. This happens when they see butterflies, reptiles, mammals and birds in combination with varied plants and mini habitats on their visits.

In this brief talk I wish to stray slightly from natural ecosystems which being well covered: to how I believe a wide awareness of ecosystems natural and man altered by botanic gardens can create interest in the public, Gardens through education, conservation, advice on plants and availability of plants through our nurseries and interest increased on visits can indirectly aid the future of our natural and unnatural terrestrial ecosystems.

Every day populations grow in our region, forest falls and buildings rise on what were stable ecosystems, what are those areas now, usually radically altered, unstable habitats where flora and fauna exist and are largely controlled by people, some of whom we can influence.

The amount of life a habitat can support is its carrying capacity, this varies with the environment and time, especially in Belize with a wet season and a dry season and an occasional hurricane.

In the suburbs it can vary with how much waste goes on the compost heap and how much goes in the garbage and what species are planted. In a botanic garden when, how, how much and what height the grass is cut.

Now before I continue I must add that we in Belize are partly the odd ones out, as far as not being an island we are just north of the land bridge which linked south and north America around 3 million years ago, The land bridge in allowing floras to mix must have led to many extinctions and has left us with a fairly though flora, We have a few ecological island which could be highly vulnerable to exotics, we have some invasive and potentially invasive exotics, but certainly do not have your island or Florida's life zone island situation.

I will now give some examples which I hope will stress OBSERVE what is going on, UNDERSTAND as far as is possible, and then we can EXPLAIN and have examples and can show and advise the public.

1/ A couple recently visited this garden, the man enjoyed the plants but the lady was ecstatic about the garden of butterflies, their route had passed by Pride-of-Barbados, *Hamelia patens*, *Bauhinia divaricata* and other flowering plants. They were tourists, but had they been locals I could have told them that we had some of those butterfly attractive plants for sale, which would have boosted the butterfly carrying capacity of their garden and her enthusiasm,

This is a bit simplified as we have wild areas which should have, although we don't know them, the caterpillar food plants, every plant is important to something and in our ignorance wild areas should be left alone.

2/ 15 miles downstream is Warrie Head Lodge with 135 acres of which 6 acres were bush hogged in one go every year to keep it under control. A couple of days later after the vultures had finished up the chopped up remains of animals, it has an above ground carrying capacity of nearly zero.

I changed that to bush hog width strips, the first was cut leaving 2 widths, the second was cut 4 months later, the third at 8 months, returning to the first at 12 months.

The change was dramatic, with a white tailed kite almost a daily visitor, a pair of grey hawks moved in and a pair of laughing falcons raised a young (they feed on long thin snakes). Four species of seedeater birds and grey crowned yellowthroat warblers became residents.

The health (carrying capacity) of an area is indicated by the top of the food chain species in that area.

3/ Botanic gardens and lawns in general.

Grasses are among the most highly productive plants; remember we are largely grass seed eaters ourselves. It is best not to wipe out all caterpillars, grasshoppers, bugs, lizards and flowers and seed in one go. Where possible patches, strips or sections should be left.

Where all has to be cut the conservation golden rule of start centrally and work out, not outside to the middle should be followed.

4/ The Balancing Act

What looks good to humans may not be good for wildlife. Always observe, think and then decide on action.

Most wildlife needs shelter, a place to reproduce as well as food and water.

Terrestrial animals like voles, lizards, spiders, peripatus, agoutis need varying amounts of ground cover/debris/brush pile and burrows. It is sometimes best not to clean all heliconia clumps if no alternative cover is on hand. Post flowering plants may look a mess but will tidying up remove a seed beery crop; this also applies to aforementioned lawns.

Removal of plant remains even yellowing leaves removes nutrients, especially important in our case of degraded cleared pasture.

What can be chopped up small and left around plants is best, especially for soil organisms and nutrient recycling of that plant. Second best is composting and recycling and in the case of wood pile it up and recycle, in our case 3 years later!

Bare soil is to be minimized, it provides little shelter, no recycling, dries out quickly from wind and sun, has large diurnal temperature variations and often forms an impermeable surface layer. Yes, deserts, salt flats, rocky outcrops have bare soil but ours were originally under woodland cover.

Availability of food and layout is important, feeding flocks of birds, trapline hummingbirds and butterflies prefer in sight next food plant availability. One clump of a food plant is of limited attraction. Note our almost chance layout of *Hamelia patens*, and out many Pride-of-Barbados; to some too much of one species But...!

5/ Very little can make a difference, 2 cases.

a) In Belize City a front garden has an 8' diameter, 15' high clump of spiny *Bactris major*, it was chopped down. The population of melodious blackbirds crashed as their only safe city roost had gone.

b) In pruning a *Bucida buceras* lower branch tangle many ants were observed but no nest, the pruning isolated the tree but an ant garden tree was two trees away. A nylon twine bridge linking the trees was in full use within a couple of hours.

6/ Belize's Holiday Paradise of San Pedro, Ambergris Caye

To those who knew the Caye thirty years ago, it is a disaster. The littoral forest has nearly vanished with fragmented remnants, but does this habitat have a carrying capacity, it is certainly nothing compared with before, but what is happening?

A tall coconut palm has orioles and warblers feeding on it especially around the inflorescences; under a smaller coconut palm are signs of a fruit bats feeding station, a couple of Pouteria seeds but a mass of *Terminalia catappa* (Tropical almond) seeds. A little way off is the Tropical almond tree with horizontal bands of holes from a wintering sapsucker woodpecker. A flock of Indigo buntings usually a grass seedeater, but there are no untidy seeding grasses here, are feeding 40' up on a *Casuarina equisetifolia* seeds.

Coconuts, tropical almonds, casuarinas are all exotics and have no place here some would say: but they are fulfilling a role, keeping pollinators and seed dispersers alive for the native species too and are acceptable the people (a thorny Sapotaceae *Bumelia* isn't). Of course there are a few *Cordia sebestena*, *Bursera simaruba*, *Metopium brownei*, *Lantana* spp., *Ficus citrifolia*, *Thrinax radiata* and some sapotaceae around, as well as hibiscus, bougainvilleas, variegated erythrina, *Pseuderanthemums* as well.

It is our duty to know the useful 'carrying capacity' species and to encourage their planting which in some cases will involve exotics when an acceptable native species won't fill all the requirements.

We sometimes have birders visiting the garden, it is getting harder and harder for San Ignacio guides to find a half day birding destination where acceptable by maximizing the carrying capacity (not by adding inorganic fertilizer) we can attract more visitors.

The better native species for birds, berry wise tends to be *Busera simaruba*, *Hamelia patens*, *Chrysophyllum mexicanum*, Heliconias and prostrate Rubiaceae (Geophila and close genera). However, we cannot ignore exotics; a 2004 drought caused a failure of *Chrysophyllum mexicanum* to fruit; the main tree to keep up the carrying capacity was an exotic, *Cananga odorata*. You are likely to see the huge crow sized oriole Montezuma's oredpendula feeding on African oil palm fruit.

In the case of mistletoe and mistletoe berries we have purposely steadily reducing the carrying capacity.

One species, one bird this seems to be the case with *margeuritaria nobilis* and the white crowned parrot at present.

Carrying capacity for birds can be increased by reliable food supply (insects, worms, to fruit and seeds), water supply, nest sites (nest boxes and dead trees, banks or pits for terrestrial tunnel nesters) all in a variety of habitats.

How many people have said to me, "Guess what bird is nesting in my hanging orchid basket?" and have looked disappointed when I rightly reply "A yellow throated euphonia."

I remember having a conversation on the effect of people on nature in Belize and hearing words along this theme:

'I've come to the conclusion that we can't change the world; but if everyone who wishes, does their best on their land, it will make a difference.'

That person was Ken duPlooy.