

Food amongst the
flowers-reasons for plant
diversity in butterfly
exhibits


Wings of the Tropics
AT FAIRCHILD

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Upping Your Butterfly Game Indeed....

What is your facility advertised as?

A rainforest, a tropical garden or a butterfly exhibit?

What is it that your butterflies need?

Nectar, pollen, rotting fruit, anything else?

But, who makes the decisions?

Benefits of butterfly longevity leading to cost savings and improved guest experience due to more butterflies on exhibit.

We asked some questions 2 years ago.....

We asked, “ Which nectar plants do you use?” and a number of exhibits responded:

- ▣ N = 10, average # of species/cultivars = 23
- ▣ however, 2 exhibits used less than 12 species each (6 in one small exhibit)
- ▣ N = 8, average # of species/cultivars = 27
- ▣ Not one single plant species/cultivar is used by all 10 responding exhibits

- ▣ Why is it important to have a broad variety of flowering plants?
 - Proboscis length
 - Nectar and/or pollen feeding preferences
 - Requirements for alkaloids and other compounds
 - Studies have shown that different Lepidoptera species exhibit preferences for differently colored flowers

Survey results from 10 institutions

PLANT	# OF INSTITUTIONS USING THIS SPECIES			
		<i>Cordia sebestina</i>	1	<i>Odontonema callistachyum</i>
		<i>Cosmos</i> Sp.	1	<i>Odontonema strictum</i> (tubaeforme)
		<i>Crossandra infundibulbiformis</i>	2	<i>Pachystachys coccinea</i>
<i>Acalypha hispida</i>	1	<i>Crossandra</i> Sp.	1	<i>Pachystachys lutea</i>
<i>Ageratum</i> (Mist Flower)	1	<i>Cuphea hyssopifolia</i>	3	<i>Pentas lanceolata</i> 'Falling Star Pink Bicolor'
<i>Allamanda cathartica</i>	1	<i>Cuphea ignea</i>	1	<i>Pentas lanceolata</i> 'Ruby Red' / 'Butterfly Red'
<i>Aloysia gratissima</i>	1	<i>Cuphea macropetala</i>	1	<i>Pentas lanceolata</i> 'Starburst'
<i>Aloysia virgata</i>	2	<i>Dianthus</i> Sp.	1	<i>Petreaa volubilis</i>
<i>Alpinia purpurata</i>	2	<i>Duranta erecta</i>	2	<i>Plumbago auriculata</i>
<i>Alyssum</i> Sp.	1	<i>Duranta repens</i>	2	<i>Plumeria rubra</i>
<i>Antigonon leptopus</i>	2	<i>Echinacea purpurea</i>	1	<i>Pseuderanthemum atropurpureum</i>
<i>Aptenia cordifolia</i>	1	<i>Eranthemum pulchellum</i>	1	<i>Pseuderanthemum laxiflorum</i>
<i>Arachnothryx leucophylla</i>	3	<i>Etlingera elatior</i>	1	<i>Pseuderanthemum reticulatum</i>
<i>Asclepias curussavica</i>	2	<i>Euphorbia milii</i>	1	<i>Psiguria ternata</i>
<i>Bougainvilla arborea</i>	1	<i>Galphimia</i> (= <i>Thryalis</i>)	2	<i>Psiguria triphylla</i>
<i>Brugmansia candida</i>	1	<i>Gardenia taitensis</i>	1	<i>Psiguria umbrosa</i>
<i>Buddleia</i> Sp.	1	<i>Guaiacum sanctum</i>	1	<i>Quisqualis indica</i>
<i>Caesalpinia mexicana</i>	1	<i>Gurania insolita</i> (?)	1	<i>Rondeletia splendens</i>
<i>Caesalpinia pulcherrima</i>	2	<i>Gurania spinulosa</i>	1	<i>Rondeletia odorata</i>
<i>Calliandra emarginata</i>	1	<i>Hamelia cuprea</i>	1	<i>Rudbeckia fulgida</i>
<i>Calliandra haematocephala</i>	4	<i>Hamelia patens</i>	7	<i>Russelia equisetiformis</i>
<i>Calliandra minahassae</i>	1	<i>Heliotropium arborescens</i>	1	<i>Salvia coccinea</i>
<i>Calliandra</i> Sp.	1	<i>Hibiscus rosa-sinensis</i>	4	<i>Salvia farinacea</i>
<i>Calliandra terginima</i>	1	<i>Ixora casei</i> 'Super King'	4	<i>Senecio confusus</i>
<i>Callistemon citrinus</i>	1	<i>Ixora chinensis</i>	3	<i>Stachytarpheta</i> 'Emerson's Folly' (S. mutabilis x S. franzi)
<i>Callistemon phoeniceus</i>	1	<i>Ixora coccinea</i>	8	<i>Stachytarpheta franzi</i>
<i>Callistemon viminalis</i>	2	<i>Ixora hookeri</i>	1	<i>Stachytarpheta jamaicensis</i>
<i>Centratherum intermedium</i>	4	<i>Ixora javanica</i>	1	<i>Stachytarpheta mutabilis</i>
<i>Citharexylum spinosum</i>	1	<i>Ixora</i> 'Maui Gold'	1	<i>Stachytarpheta speciosa</i>
<i>Clerodendrum bungei</i>	1	<i>Ixora</i> 'Nora Grant'	2	<i>Stachytarpheta urticifolia</i>
<i>Clerodendrum paniculatum</i>	1	<i>Jasminium sambac</i>	1	<i>Tagetes</i> Sp.
<i>Clerodendrum quadriloculare</i>	2	<i>Jatropha integerrima</i>	5	<i>Tecomaria capensis</i>
<i>Clerodendrum speciosissimum</i>	4	<i>Jatropha multifida</i>	1	<i>Tithonia rotundifolia</i>
<i>Clerodendrum splendens</i>	2	<i>Jatropha podagrica</i>	1	<i>Turnera ulmifolia</i>
<i>Clerodendrum thompsonae</i>	2	<i>Justicia brandegeana</i>	1	<i>Verbena</i> Sp.
<i>Clerodendrum ugandense</i>	2	<i>Justicia</i> Sp.	2	<i>Warszewiczia coccinea</i>
<i>Cnidoscylus aconitifolius</i>	2	<i>Lantana camara</i>	7	<i>Wedelia trilobata</i>
<i>Codiaeum variegatum</i>	1	<i>Liatis</i> Sp.	1	<i>Zinnia</i> Sp.
<i>Coffea arabica</i>	1	<i>Ligustrum japonicum</i>	1	
<i>Cordia sebestina</i>	1	<i>Myrciaria cauliflora</i>	1	

115 species /
cultivars

Most popular (min. 3 institutions)

Arachnothryx leucophylla	3
Calliandra haematocephala	4
Centratherum intermedium	4
Clerodendrum speciosissimum	4
Cuphea hyssopifolia	3
Hamelia patens	7
Hibiscus rosa-sinensis	4
Ixora casei 'Super King'	4
Ixora chinensis	3
Ixora coccinea	8
Jatropha integerrima	5
Lantana camara	7
Odontonema strictum (tubaeforme)	5
Pentas lanceolata 'Ruby Red' / 'Butterfly Red'	8
Psiguria triphylla	3
Psiguria umbrosa	7
Senecio confusus	3
Stachytarpheta franzi	5
Stachytarpheta jamaicensis	7
Stachytarpheta mutabilis	3
Stachytarpheta urticifolia	4

21
species/cultivar

s

We should all use some of these;
Stachytarpheta Spp.



S. franzi



S. mutabilis



S. urticifolia



S. speciosa



**S.
jamaicensis**



S. cayennensis



S. strigosa (Naples Lilac)

and these....

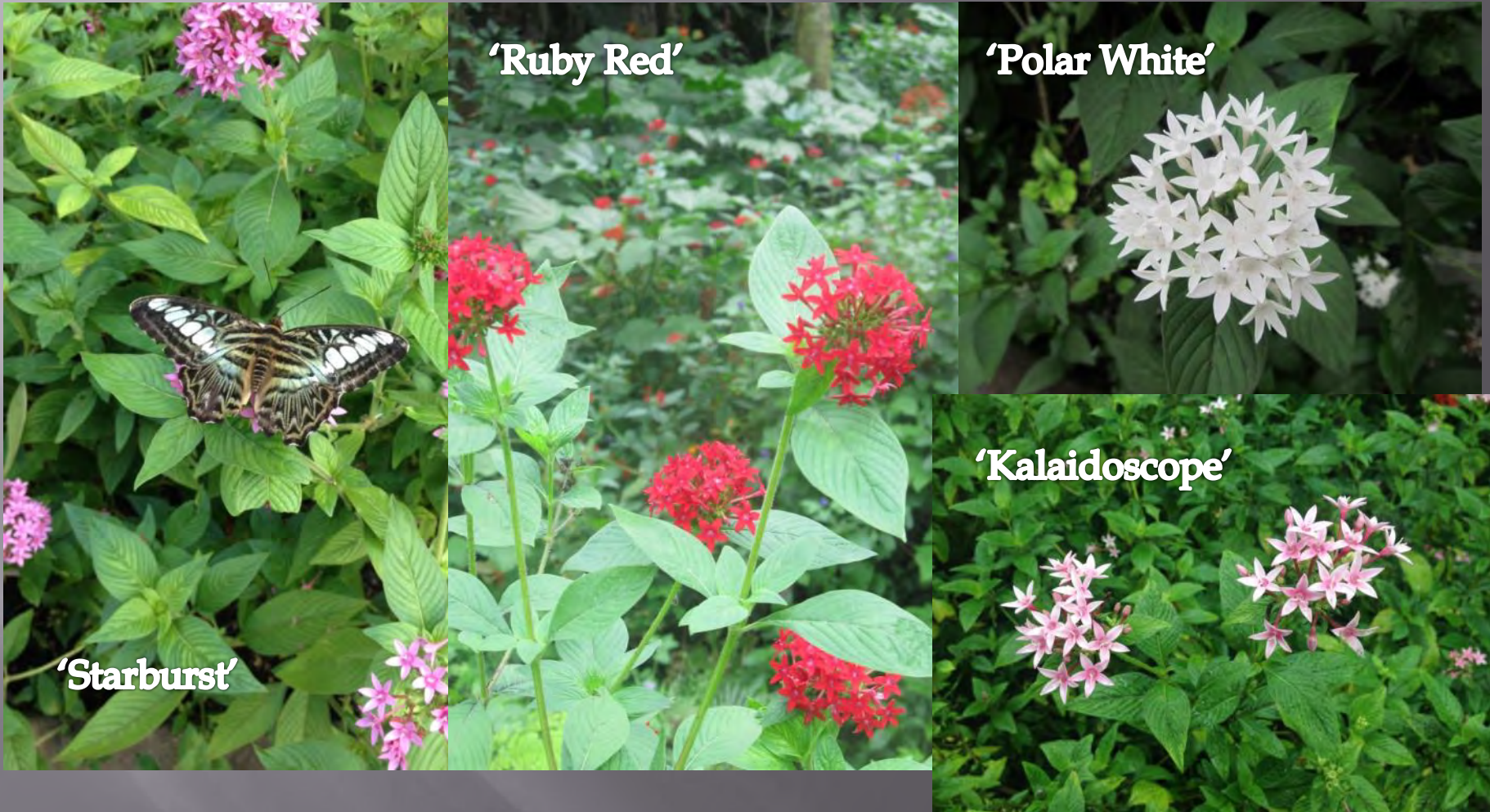
Pentas lanceolata

'Ruby Red'

'Polar White'

'Kalaidoscope'

'Starburst'



Be certain to have Psiguria Spp. and Gurania Spp.



Psiguria pedata



Psiguria ternata



Gurania coccinea



Psiguria warszewiczii



Gurania makoyana



Psiguria triphylla



Psiguria umbrosa

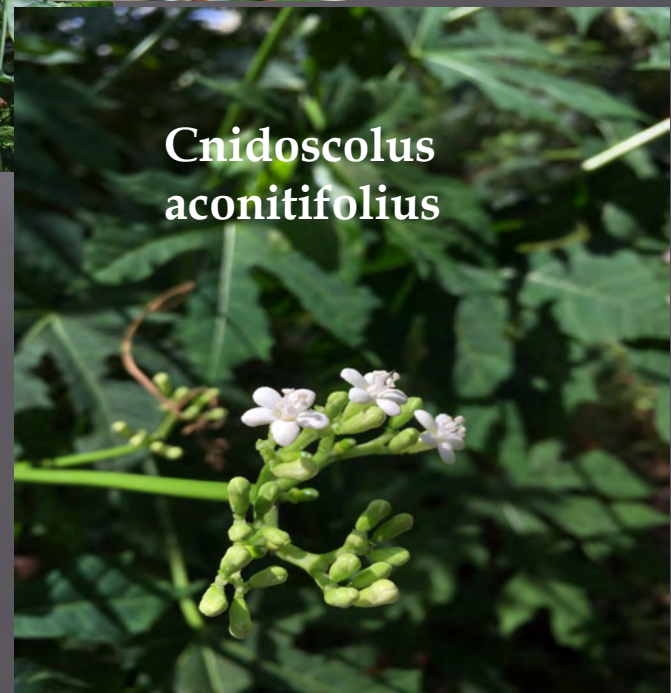


Gurania bignoniacea

All the Clerodendrum Spp.



Euphorbiaceae



Popular and readily available

Ixora casei 'Super King'



Ixora coccinea 'Maui Gold'



Hibiscus rosa-sinensis



Odontonema tubaeforme



Odontonema 'Panama Purple'



Hamelia patens



Calliandra Sp.



Winter flowering plants



*Arachnothryx
leucophylla*



Dombeya 'Seminole'



Not as commonly used, but important...

Conoclinium Sp.
Native Mist Flower



Verbena bonariensis



**Heliotropium
indicum**



Bartletina sordida

**Callistemon
citrinus**



**Epidendrum
radicans**

Some you should definitely try if you can....



Plants used in Wings of the Tropics @ Fairchild

Arachnothryx leucophylla

Bartletina sordida

Bidens pilosa

Clerodendrum paniculatum

Clerodendrum speciosissimum

Clerodendrum x *speciosum*

Clerodendrum splendens

Clerodendrum thompsonae 'delectum'

Cnidosculus aconitifolius

Combretum rotundifolium

Conoclinium coelestinum (Mist Flower)

Cordia sebestina

Dombeya "Seminole"

Dombeya 'Pink Princess'

Duranta repens

Epidendrum radicans (ground orchid)

Gurania bignoniacea

Gurania makoyana

Gynura pseudochina

Hamelia patens

Heliotropium indicum

Ixora casei 'Super King'

Ixora casei 'Trinidad'

Ixora coccinea 'Maui Gold'

Jatropha integerrima

Jatropha multifida

Jatropha podagrica

Morinda latibractea

Mussaenda erythrophylla

Odontonema "Panama Purple"

Odontonema tubaeforme

Psychotria grandis

Pentas lanceolata 'Kalaidoscope'

Pentas lanceolata 'Polar White'

Pentas lanceolata 'Ruby Red'

Pentas lanceolata 'Starburst'

Pseudomussaenda flava

Psiguria pedata

Psiguria ternata

Psiguria triphylla

Psiguria umbrosa

Psiguria warszewiczii

Palicourea elata

Psychotria poeppigiana

Senecio confusus

Stachytarpheta cayenensis

Stachytarpheta 'Emmerson's Folly'

Stachytarpheta franzi

Stachytarpheta jamaicensis

Stachytarpheta 'Mario Pozla'

Stachytarpheta mutabilis

Stachytarpheta speciosa

Stachytarpheta strigosa (Naples Lilac)

Stachytarpheta urticifolia

Strobilanthes cusia

Turnera ulmifolia

Verbena bonariensis

Warszewiczia coccinea

Recent additions :



Psychotria grandis



Palicourea guianensis



Pentagonia macrophylla

Asteraceae

Vernonanthura patens



Quechualia fulva



Eirmocephala brachiata



Gynura pseudochina



Rubiaceae species coming soon to Fairchild...

Palicourea elata



Psychotria glomerulata



**Palicourea
correae**



Foto: Alex Espi

**Palicourea .
chiriquiensis**



Recent study by 2 high-school students; food for thought....

- ▣ They collected and analysed nectar in a number of plant species we use:
- ▣ This is an extract of their presentation.....

Nectar concentration factors in butterfly flowers

Rhys Campo, Kiara McCalister

Pentas lanceolata



Ixora Spp.



*Odontonema
tubaeforme*



*Strobilanthes
cusia*



Refractometer

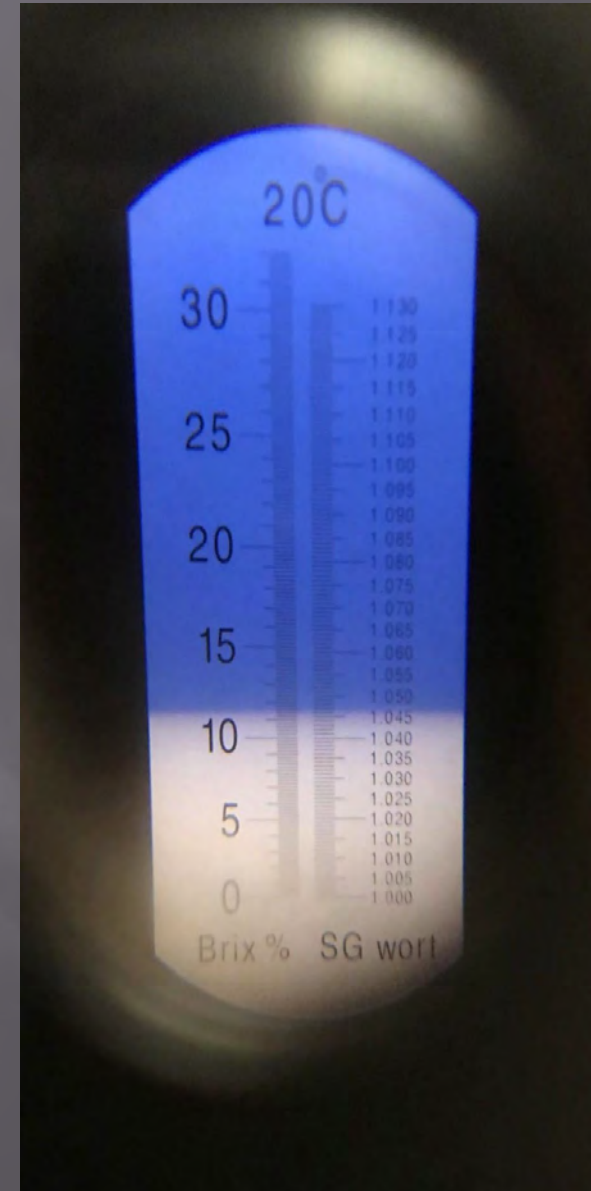
☰ Measures in:

☰ % Brix

☞ 1 gram of sucrose in 100 grams of solution

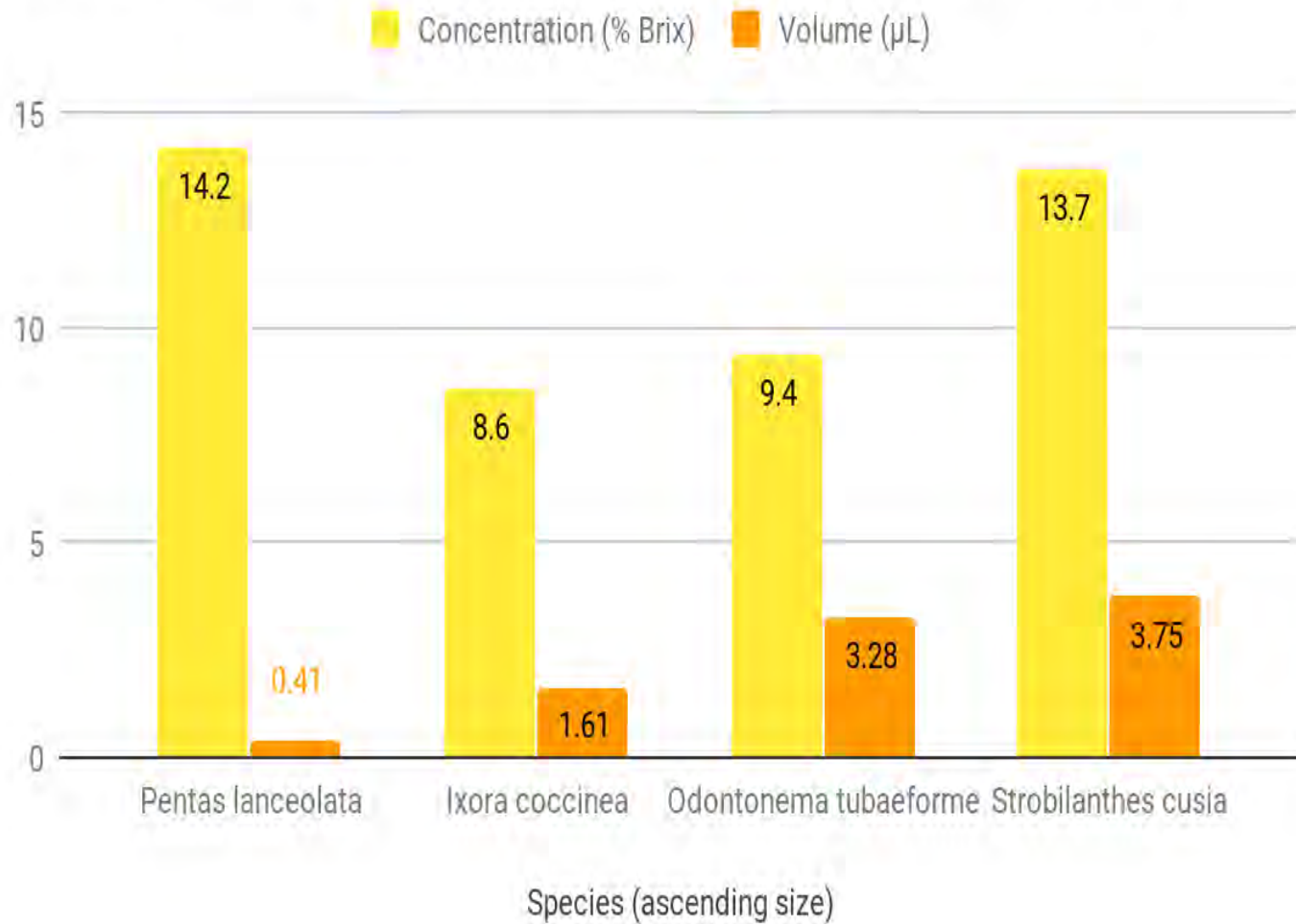
☰ Specific gravity

☞ Ratio of density of substance to density of plain water



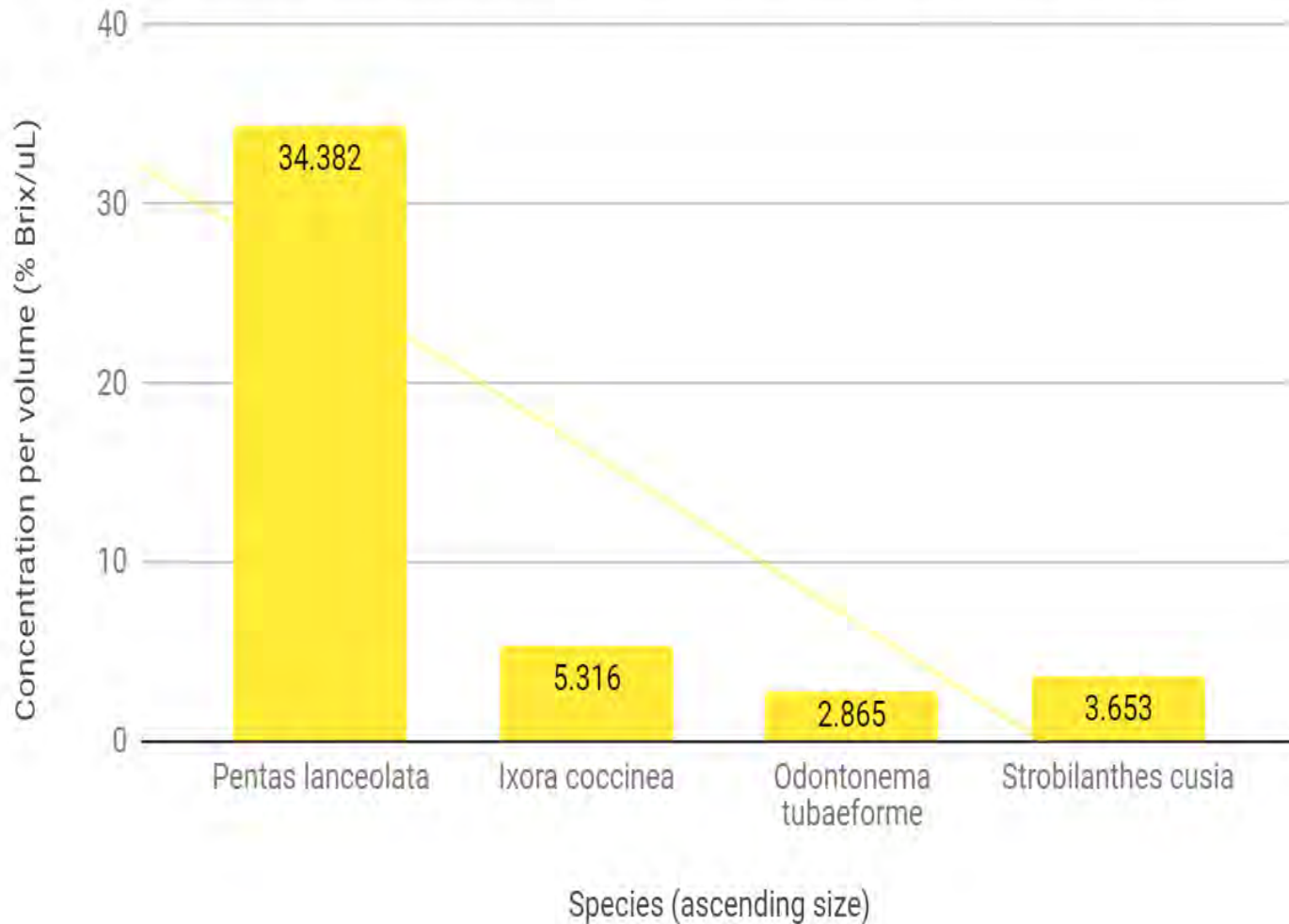
Data

Average nectar concentration and volume in select species.



Data

Average nectar concentration per volume in select species.



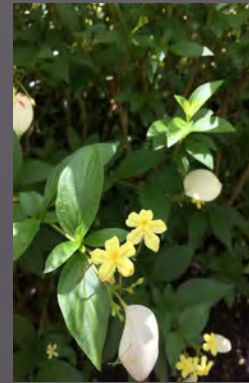
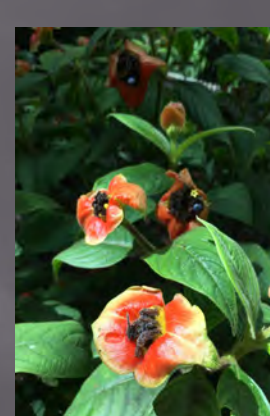
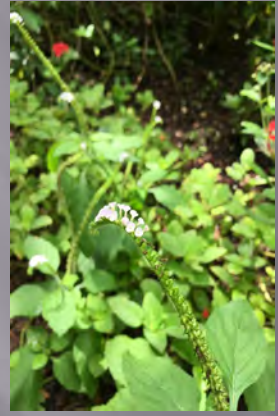
Studies and Observations of Butterfly Nectar Plant Preferences in Wings of the Tropics @ Fairchild

Alicia Muñoz



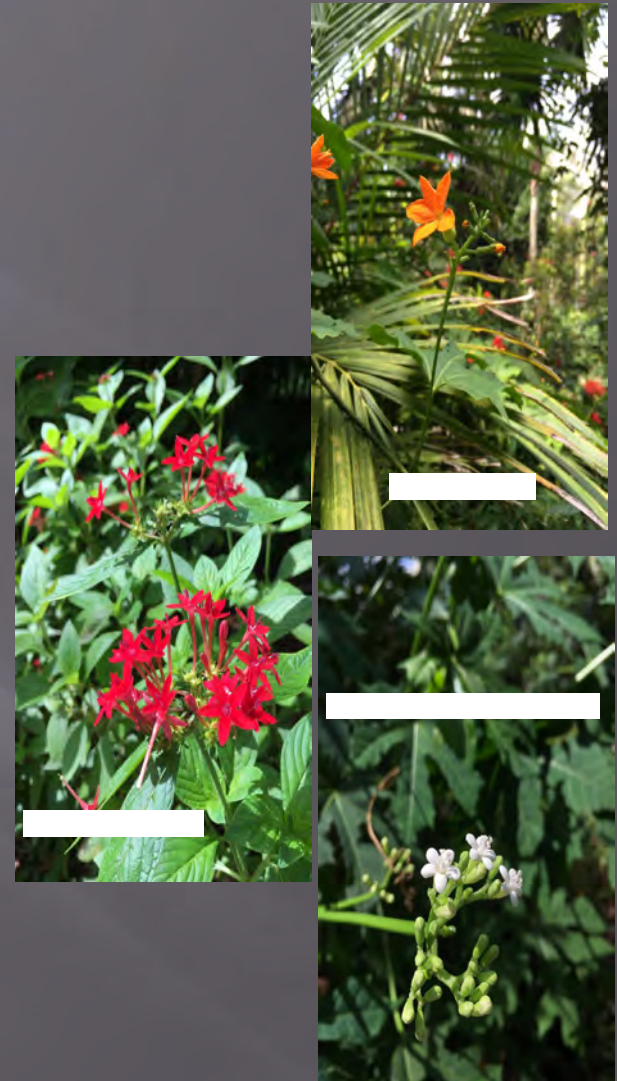
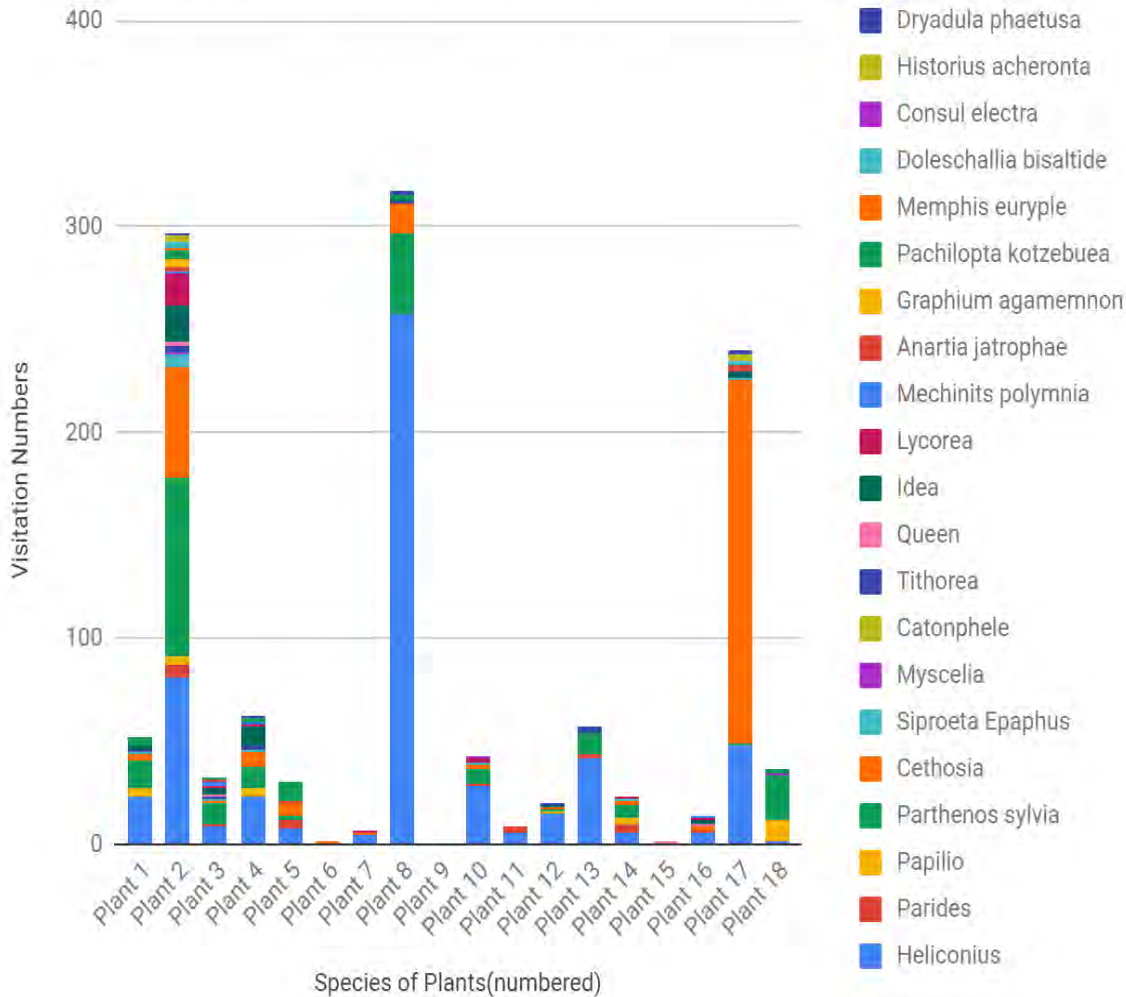
FAIRCHILD TROPICAL BOTANIC GARDEN
Herbarium, Exhibiting and Conserving the World of Tropical Plants

Species of Nectar Plants



Data & Data Analysis

Plant Observations From 6/24-7/19



If you have limited space and resources, please plant these:

- ▣ *Pentas lanceolata* 'Ruby Red'
- ▣ *Psiguria* (any species will work, but more are better)
- ▣ *Stachytarpheta* Sp. (many to choose from)
- ▣ *Clerodendrum paniculatum* and *C. splendens*
- ▣ *Psychotria poeppigiana*
- ▣ *Ixora casei*
- ▣ *Jatropha integerrima*
- ▣ *Cnidocaulis aconitifolius*
- ▣ Something in the *Asteraceae* (can be native Spp.)

▣ Thanks to all those who sent information:

- ▣ Zack Lemann - Audubon Butterfly Garden
- ▣ Lea Morgan - Boston Museum of Science
- ▣ Nathan Brockman/ Anita Westphal - Reiman Gardens
- ▣ Martha Flanagan - N.C. Museum of Natural Science
- ▣ Nancy Greig - Cockerill Butterfly Center
- ▣ Lauren Davidson - Butterfly Wonderland
- ▣ Sarah Moore - Pacific Science Center
- ▣ Cheryl Tyndall - Niagara Parks Butterfly Conservatory
- ▣ Bobbi Jo Holmes - Museum of Life and Science
- ▣ Laura Chisholm - Sophia Sachs Butterfly Conservatory

▣ Graduates of BioTech High School, Miami, Fl. :

- ▣ Kiara McCalister
- ▣ Rhys Campo

▣ 2019 Summer Botany intern:

- ▣ Alicia Munoz

Thank you,

Questions?