

THE BRAZILIAN SOLITARY BEE SPECIES CAUGHT IN TRAP NESTS

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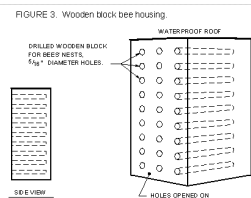
Workshop on Solitary Bees: Conservation, Rearing and Management for Pollination
Beberibe, Ceará April 26-30, 2004

Trapnests - Karl Krombein

Technique: Pieces of wood/bamboo with holes of different diameter.



From: Mauro Pinzauti



From: Suzanne Batra



Krombein 1967: 3400 nests

75 wasps, 43 bees, 83 parasites

Bionomic data: number of generation, sex ratio, parasites, enemies, development, nest architecture.

Trapnests in Brazil

First study: 1978

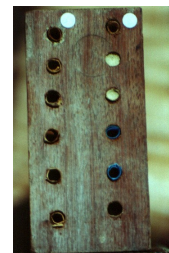
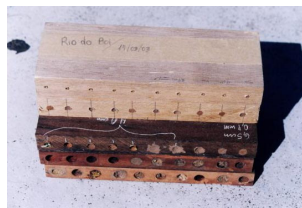
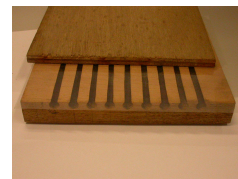
Serrano, J. C. & C. A. Garófalo 1978. Utilização de ninhos artificiais para o estudo bionômico de abelhas e vespas solitárias. *Ciência e Cultura*, 30: 597.

2004: 23+ 10 studies (33) + abstracts

Trapnests in Brazil

Methods:

- Bamboo cane
- Pieces of wood
- Pieces of wood with holes
- Wooden boxes



Bees caught in trapnests in Brazil

ca. 60 species*

Apidae

Megachilidae

Colletidae

*based on 13 studies

Bees caught in trapnests in Brazil

Apidae /Centridiini (8+ spp.)

Centris (Heterocentris) analis Fabricius

Centris (Heterocentris) bicornuta Mocsary

Centris (Heterocentris) labrosa Friese

Centris (Heterocentris) terminata Smith

Centris (Hemisiella) dichotricha (Moure)

Centris (Hemisiella) tarsata Smith

Centris (Hemisiella) vittata Lep.

Centris spp.

Bees caught in trapnests in Brazil

Apidae/Euglossina (19 +)

<i>Eufriesea auriceps</i> Friese	<i>Euglossa fimbriata</i> Rebêlo & Moure
<i>Eufriesea mussitans</i> (Fabricius)	<i>Euglossa gairanii</i> Dressler
<i>Eufriesea purpurata</i> (Mocsáry)	<i>Euglossa melanotricha</i> Moure
<i>Eufriesea surinamensis</i> (L.)	<i>Euglossa modestior</i> Dressler
<i>Eufriesea theresiae</i> (Mocsáry)	<i>Euglossa pleosticta</i> Dressler
<i>Eufriesea violacea</i> (Blanchard)	<i>Euglossa townsendi</i> Cockerell
<i>Eufriesea violacens</i> (Mocsáry)	<i>Euglossa truncata</i> Rebêlo & Moure
<i>Euglossa annectans</i> Dressler	<i>Euglossa</i> spp.
<i>Euglossa avicula</i> Dressler	<i>Eulaema nigrita</i> Lep.
<i>Euglossa cordata</i> (L.)	

Bees caught in trapnests in Brazil

Apidae/ Tetrapediini (7)

<i>Tetrapedia amplitarsis</i> Friese
<i>Tetrapedia curvitaris</i> Friese
<i>Tetrapedia diversipes</i> Klug
<i>Tetrapedia garofaloi</i> Moure
<i>Tetrapedia ornata</i> Spinola
<i>Tetrapedia rugulosa</i> Friese
<i>Tetrapedia</i> sp.

Apidae/ Xylocopini (3)

<i>Xylocopa frontalis</i> (Olivier)
<i>Xylocopa grisescens</i> Lep.
<i>Xylocopa suspecta</i> Moure

Bees caught in trapnests in Brazil

Megachilidae / Anthidiini (17 +)

<i>Anthidium manicatum</i> (L.)	<i>Epanthidium tigrinum</i> (Schr.)
<i>Anthidulum</i> spp.	<i>Epanthidium nectarinoides</i> Schr.
<i>Anthodioctes manauara</i> Urban	<i>Epanthidium</i> spp.
<i>Anthodioctes megachiloides</i> Holmberg	<i>Dicranthidium arenarium</i> Ducke
<i>Anthodioctes lunatus</i> (Smith)	<i>Dicranthidium luciae</i> Urban
<i>Anthodioctes moratoi</i> Urban	<i>Duckeanthidium</i> spp.
<i>Anthodioctes</i> spp.	<i>Saranthidium marginatum</i>
<i>Carloticola paraguayensis</i> (Schr.)	Moure & Urban
<i>Epanthidium erythrocephalum</i> (Schr.)	
<i>Epanthidium maculatum</i> Urban	

Bees caught in trapnests in Brazil

Megachilidae / Megachilini (11 +)

<i>Megachile</i> (<i>Austromegachile</i>) <i>orbiculata</i> Mitchell
<i>Megachile</i> (<i>Austromegachile</i>) <i>sussurans</i> Haliday
<i>Megachile</i> (<i>Chrysosarus</i>) <i>guaranitica</i> Schrottky
<i>Megachile</i> (<i>Dactylomegachile</i>) sp.
<i>Megachile</i> (<i>Neochelynia</i>) <i>brethesi</i> Schrottky
<i>Megachile</i> (<i>Pseudocentron</i>) <i>lissotate</i> Moure
<i>Megachile</i> (<i>Pseudocentron</i>) spp.
<i>Megachile</i> (<i>Ptilosaroides</i>) <i>xanthoptera</i> Schrottky
<i>Megachile</i> (<i>Rhysochile</i>) <i>cara</i>
<i>Megachile</i> (<i>Sayapis</i>) <i>dentipes</i> Vachal
<i>Megachile</i> spp.

Bees caught in trapnests in Brazil

Colletidae (3-4 spp)

Colletinae

Colletes rufipes Smith

Hylaeini

Hylaeus spp.*

* Smaller holes –3mm

Potential Pollinators

promising species:

Centris analis, *C. tarsata*, *C. vittata*

Eulaema nigrita, *Euglossa cordata*

Xylocopa frontalis

Megachile guaranitica, *Epanthidium tigrinum*

Tetrapedia diversipes

Anthodiocetes spp.

- wide distribution
- constant in traps
- studies on biology

Studies on the biology

Euglossini

About 15 studies.

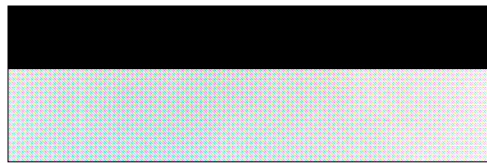
Cells arranged in rows



Nest of *Eufriesea surinamensis*



Nest of *Euglossa truncata*



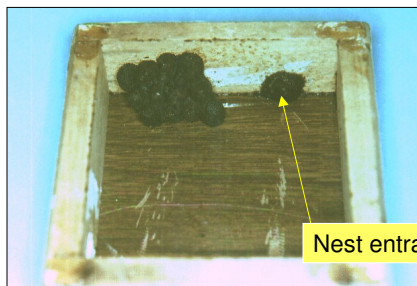
Nest of *Euglossa pleosticta*

Photos by C. A. Garófalo

Studies on the biology

Euglossini

Cells arranged in “combs”



Nest of *Euglossa truncata*



Nest of *Euglossa cordata*

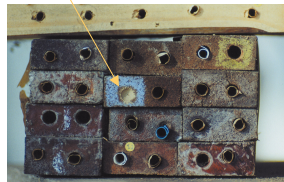
Common parasites:
Coelioxys, *Anthrax*

Photos by C. A. Garófalo

Studies on the biology

Tetrapedia diversipes

Tetrapediini



Nest material: oil + sand

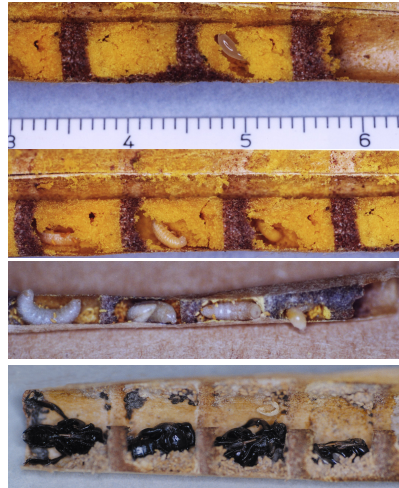
Parasite: *Coelioxoides waltheriae*

Bivoltine or multivoltine

Studies on the biology

Tetrapedia

diversipes



Alves dos Santos, I.; Melo, G. A. R. & Rozen, J. G. 2002. Biology and Imature Stages of the Bee Tribe Tetrapediini (Hymenoptera: Apidae). Am. Mus. Nov. 3377.

Studies on the biology

Anthodioctes

Anthidiini



3 studies:

Morato (2001) – *A. moratoi*

Alves dos Santos (in press) – *A. megachiloides*

Camarotti de Lima & Martins (submit.) - *A. lunatus*

Studies on the biology

Anthodioctes

megachiloides



Nest material: resin

Parasite: *Sapyga*, *Melittobia*

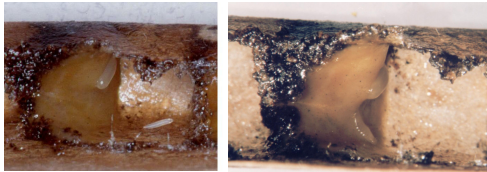
Multivoltine



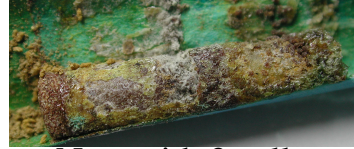
Alves-dos Santos (RBZ 2004, in press)

Studies on the biology

Anthodioctes megachiloides



Cleptoparasite - *Sapyga*



Nest with 2 cells



Cocoon of
A. megachiloides

High rate of mortality

Morato (2001): 52% - *A. moratoi*

Which
bee
for
which
plant



Potential Pollinators

Centris spp.

-acerola (West Indian cherry)

-murici (nance)

(Malpighiaceae - oil source)

-cashew (Anarcadiaceae)

-tamarind

(Caesalpineaceae - buzz flower)



Candidates:

Centris analis,

C. tarsata,

C. vittata

Potential Pollinators

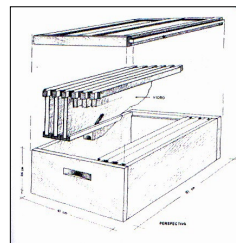
Carpenter bees - *Xylocopa* spp.

- *passion fruit*

Passifloraceae



Bamboo or *Eucalyptus*



Box for *Xylocopa*

Freitas & Oliveira Filho 2001

Potential Pollinators

Orchid bee- *Euglossina*

- buzz flowers



tomatoes,
eggplant



- Brazilian nut (*Bertholettia excelsa*)

Eulaema nigrita

Maués (2002)

Potential Pollinators

Megachile

Leguminosae

Asteraceae



Candidate:

M. guaranitica

About 150 *Megachile* native species*

* Silveira et al. 2002

Potential Pollinators

Anthidiini

Fabaceae

Asteraceae

Laminaceae



Candidate:

E. trigrinum

Anthodioctes

Impediments:

Lack of combined studies:

biology & pollinator role

Challenges

How to raise the solitary bees in major scale in Brazil?

- how to increase the population of *T. diversipes*?
- how to manage *A. megachiloides* in large scale?
- how many *C. tarsata* are needed for 1ha of cashew field?

How to convince the farmers about the benefits of the pollinators?

Initiatives

Environmental Ministry

MMA / Probio

support for studies for the

Pollinator Program

2003 + 2004

Plantation of beans in
southern Brazil /
Criciúma, SC

Phaseolus



Visitors of *Phaseolus* in Criciúma



Bumblee bees- *B. atratus*, *B. morio*

Honey bee- *Apis mellifera*

Megachile sp., *Hypanthidium* sp.

Traps of bamboo for bean fields



Silva & Alves dos Santos (in prep)

Next steps:

- define the pollinators
- increase their populations
- build up a management plan

Recomendations

1. Define which crops & which bees
2. Understand their life cycle to be able to control the development and emergence of adults
3. Detect all their needs and supply enough source for nesting (food and nest material)
4. Control the parasites
5. Control of agrochemicals with the growers
6. Campaigns about the benefits of the pollinators



Acknowledgments

Breno Freitas, Symposium Organization.

MMA, CNPq

Thiago de Souza / UNESC