DIVERSITY OF POLLEN RESOURCES USED BY STINGLESS BEES IN THE BRAZILIAN AMAZON FOREST

Maria Lúcia Absy[1] André Rodrigo Rech[2] & Marcos Gonçalves Ferreira[1]

1. Instituto Nacional de Pesquisas da Amazônia (INPA)

2. Instituto de Biologia (Unicamp)

Summary

- **Diversity of Neotropical stingless-bees**
- **Knowledge of pollen used by bees in the Amazon**
- **Excursions to the great rivers**
- **Pollen sampling**
- **Plant species used by 23 species of Meliponini**
- **Temporary specialization**
- **Pollination of the used resources**
- **Post-emergence residue of *Melipona interrupta* Latreille larvae**
- **Plant species diversity consumed by larvae**
- **Generalism, plant diversity and species preferences**

Diversity of Neotropical stingless-bees

Stingless bees are particularly diverse and widespread in the Neotropics where they play an important role as pollinators.

Around 5000 bee species are thought to occur in the Neotropics, including 391 eusocial stingless bee species (Meliponini), an important pollinating bee taxa (Slaa et al, 2006).

Slaa, E. J., Sánchez Chaves, L. A., Malagodi-Braga, K. S. and Hofstede, F. E. (2006) 'Stingless bees in applied pollination: Practice and perspectives', *Apidologie*, vol 37, pp. 293–315.

Knowledge of pollen used by bees in the Amazon

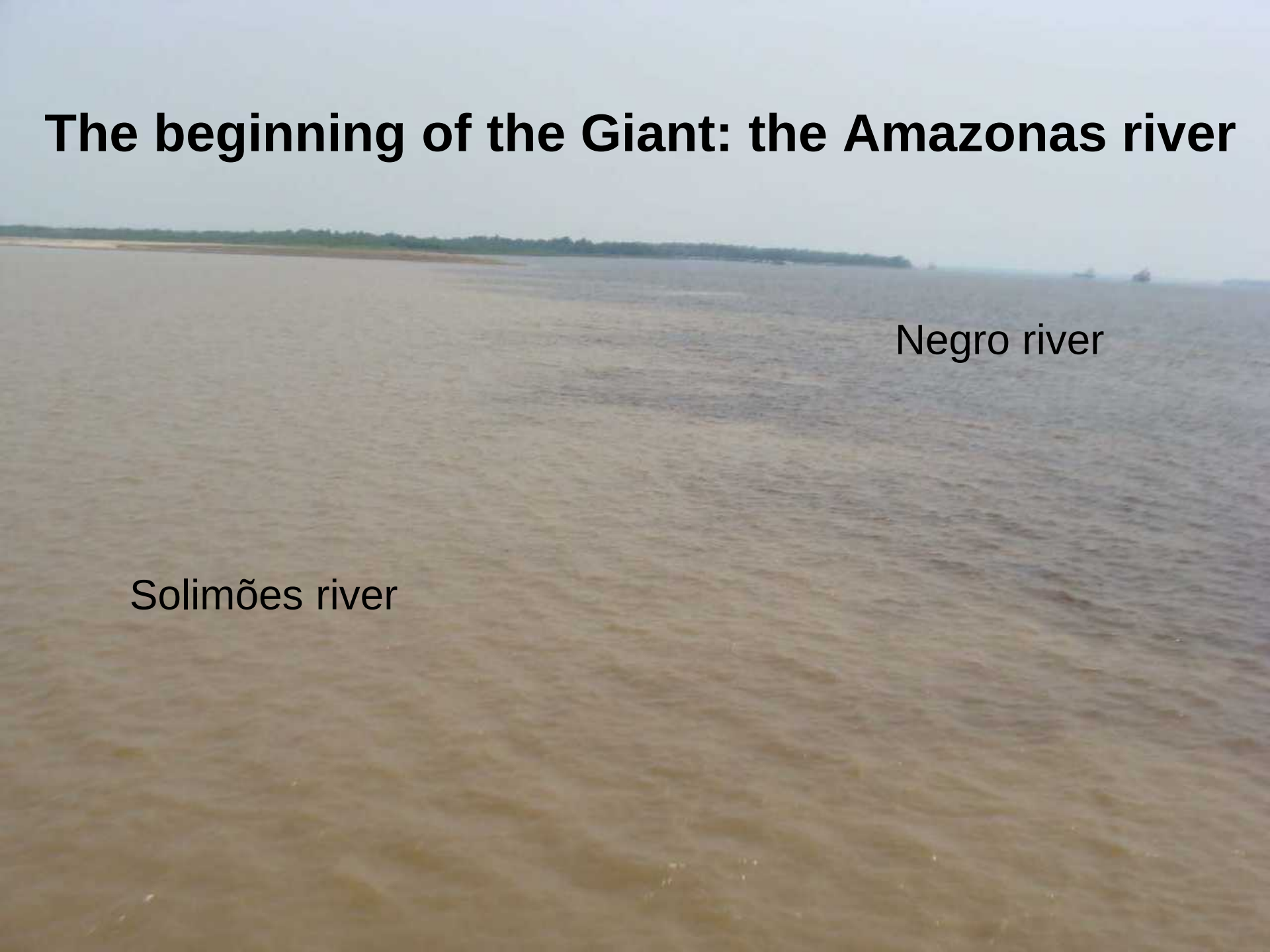
Altogether, we studied a total of 42 species of stingless bees, during the period 1977-2011, of which two are known to be key species for regional meliponiculture.

***Melipona (Michmelia) seminigra merrillae* Cockerell, 1919 (Uruçu boca-de-renda)**

***Melipona (Melikerria) interrupta* Latreille, 1811 (Jupará)**

Apimondia
Ukraine 2013

The beginning of the Giant: the Amazonas river



Excursions to the great rivers

João Maria Franco Camargo

Warwick Estevam Kerr

Auxiliars

Species	Pollen studies in Amazonia
Melipona seminigra seminigra	**Marques-Souza (1999)**
Melipona seminigra merrillae	**Absy & Kerr (1977), Absy *et al*. (1980), Santos (1991), Oliveira *et al.* (2009)**
Melipona rufiventris paraensis	**Absy*et al.*(1980), Absy *et al*.(1984), Maques-Souza *et al.*(1995)**
Melipona compressipes manaosensis	**Marques-Souza(1996), Marques-Souza (1999)**
***Melipona rufiventris* Camargo MS**	**Absy*et al*.(1984)**
Melipona Fulva	**Absy *et al*.(1984), Oliveira *et al*.(2009)**
Melipona interrupta interrupta	**Absy *et al*.(1984)**
***Melipona tumupasae* Schwarz**	**Absy *et al*.(1984)**
***Melipona seminigra pernigra* Moure & Kerr**	**Absy *et al*.(1984)**
***Trigona (Trigona) cilipes cilipes* (Fab)**	**Absy *et al*.(1984)**
***Trigona (Trigona) pallens pallens*(Fab)**	**Absy *et al*.(1984)**
***Trigona (Trigona) cf. fuscipennis* Friese**	**Absy *et al*.(1984)**
***Trigona (Trigona) amalthea* (Oliver)**	**Absy *et al*.(1984)**

Trigona williana	**Marques-Souza *et al.* (1996)**	
Trigona fulviventris	**Oliveira *et al*. (2009)**	
***Trigona (Trigona) chanchamayoensis*Schwarz**	**Absy*et al*.(1984)**	
***Partamona (Partamona) pseudomusarum* Camargo**	**Absy*et al*.(1984)**	
***Partamona (Partamona) vicina* Camargo**	**Absy *et al*.(1984)**	
***Partamona (Partamona) mourei* Camargo**	**Absy *et al*.(1984)**	
***Partamona (Partamona)* sp.1**	**Absy *et al*.(1984)**	
***Partamona (Partamona)* sp.2**	**Absy *et al*.(1984)**	
***Nanotrigona (Scaptotrigona) postica flavisetis* Moure MS**	**Absy *et al*.(1984)**	
***Nanotrigona (Scaptotrigona) polysticta* Moure**	**Absy *et al*.(1984)**	
***Nanotrigona (Scaptotrigona) minuta* (Lep.)**	**Absy *et al*.(1984)**	
***Tetragona goettei* (Friese)**	**Absy *et al*.(1984)**	
***Tetragona (Ptilotrigona) lurida lurida* (Smith)**	**Absy *et al*.(1984)**	

Tetragona (Ptilotrigona) lurida mocsaryi **(Friese)**	**Absy *et al*.(1984)**
Frieseomelitta silvestrii cf. faceta **Moure**	**Absy *et al*.(1984)**
Oxitrigona tataira tataira **(Smith)**	**Absy *et al*.(1984)**
Scaptotrigona **sp.1**	**Marques-Souza (1999)**
Frieseomelitta **sp.**	**Marques-Souza (1999)**
Frieseomelitta varia	**Maques-Souza *et al*. (1995)**
Scaptotrigona fulvicutis	**Maques-Souza *et al*. (2007)**
Plebeia **sp. grupo *minima***	**Rech & Absy (2011)**
Tetragonisca **sp. grupo *angustula***	**Rech & Absy (2011)**
Ptilotrigona lurida	**Rech & Absy (2011)**
Scaptotrigona **sp 2**	**Rech & Absy (2011)**
Nogueirapis butteli	**Rech & Absy (2011)**
Schwarzula coccidophila	**Rech & Absy (2011)**
Oxytrigona flaveola	**Rech & Absy (2011)**
Cephalotrigona femorata	**Rech & Absy (2011), Oliveira*et al.* (2009)**
Aparatrigona impunctata	**Rech & Absy (2011)**

Pollen sampling

Honey

pollen stored

pollen corbicula

Acetolysis (Erdtman, 1952)

Glycerin jelly (Kisser, 1935)

Sealed with paraffin (Muller, 1947)

Apimondia
Ukraine 2013

Plant species used by 23 species of Meliponini

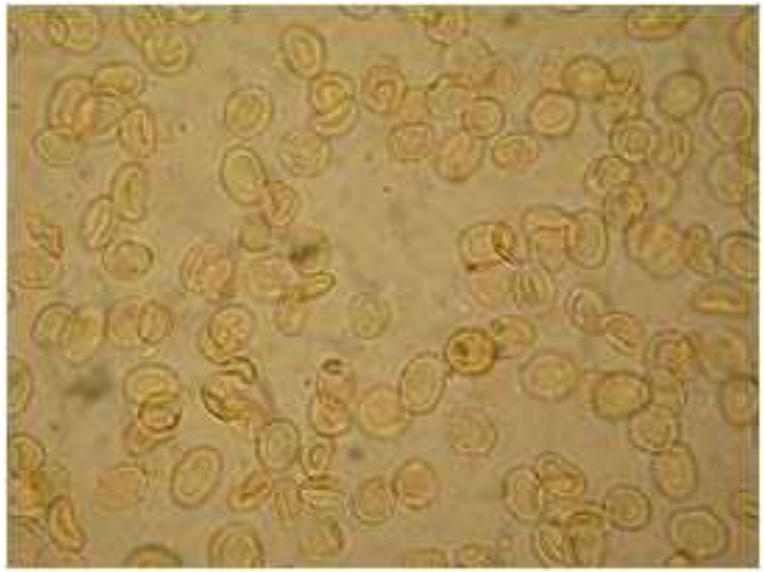
More than 150 samples were analyzed and more than 100 pollen types were found.

The analysis showed low niche overlap among species.Only nests from the same species had similar pollen profiles.

Apimondia
Ukraine 2013

Temporary specialization

17% of the pollen types showed frequency greater than 90% in one sample (600 pollen grains) which is considered a result of the temporary specialization.

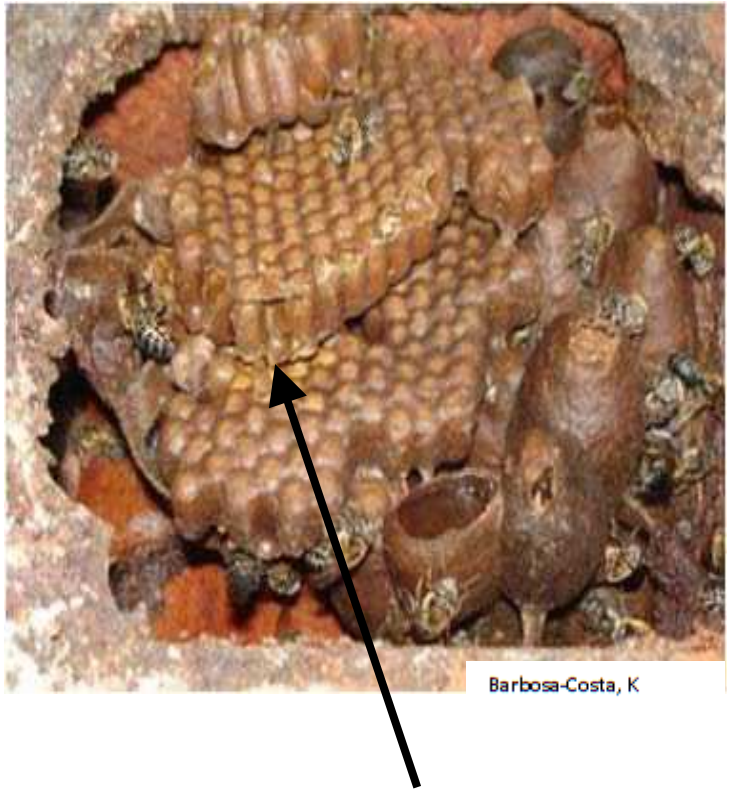


Apimondia
Ukraine 2013

Pollination of the used resources

Apimondia
Ukraine 2013

Post-emergence residue of *Melipona interrupta* larvae



Post-emergence residue “Feces”

A protocol “adapted” for collecting and processing pollen grains was applied to the pollen analysis of post-emergence residue “Feces”.

Thirty-two pollen types were analysed in the residue samples. A total of 19 botanical families were recognized and three pollen types were indeterminate.

Apimondia
Ukraine 2013

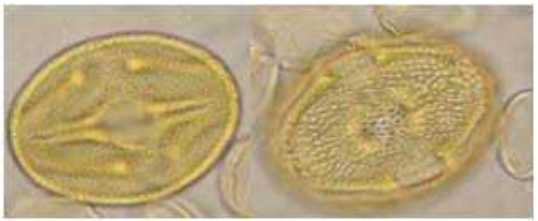
Plant species diversity consumed by larvae

The most representative family in the study was Fabaceae (Mimosoideae) with eight pollen types, the *Mimosa guilandinae* is the species present in all samples. Other pollen types, such *Alchornea* type (Euphorbiaceae), *Schizolobium amazonicum* (Fabaceae / Caesapinioideae), *Miconia* type (Melastomataceae) and *Solanum* type (Solanaceae) were also present in all studied residue samples.

Photomicrographs of pollen grains of post-emergence residue of *Melipona interrupta*, detailing the pollen grain of *Mimosa pudica* L. (Mp) with the internal content (a-d) in slides assembled by the present method (a-d) and slides undergone the acetolysis method (e-f) (scale at 10 mm)

Generalism, plant diversity and species preferences

Anacardiaceae



Spondias mombin

Anacardium occidentale

Tapirira guianensis

Pollen types found in the samples

Apimondia
Ukraine 2013

Fabaceae (Caesalpinioideae)

http://www.google.com.br/images

Cassia siamea

Cassia latifolia

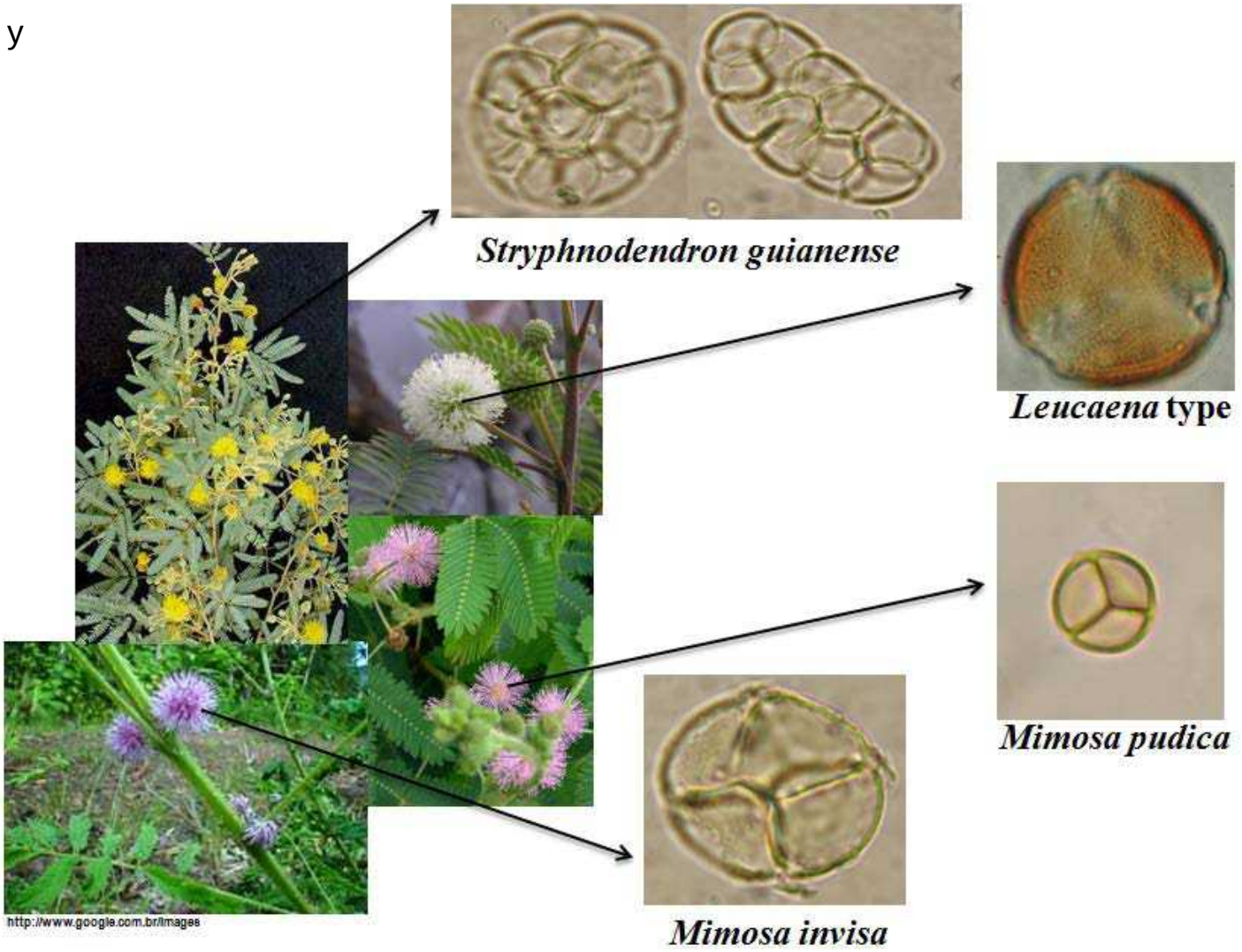
Cassia quinquangulata

Cassia reticulata

Apimondia
Ukraine 2013

Fabaceae (Mimosoideae)

y



CONCLUSION

The plant species used by 23 species of Meliponini showed low niche overlap among species. Only nests from the same species had similar pollen profiles.

17% of the pollen types showed frequency greater than 90% in one sample (600 pollen grains) which is considered a result of the temporary specialization

Rech, A. R. & Absy, M. L. 2011. Pollen sources used by species of Meliponini (Hymenoptera: Apidae) along the Rio Negro channel in Amazonas, Brazil. **Grana** 50: 150-161.
Rech, A. R. & Absy, M. L. 2011. Pollen storages in nests of bees of the genera *Partamona*, *Scaura* and *Trigona* (Hymenoptera, Apidae). **Revista Brasileira de Entomologia** 55: 361-372.

CONCLUSION

In the pollen analysis of post-emergence residue “Feces”, thirty-two pollen types distributed in 19 plant families were found.

The development and adaptation of methods of collection and chemical processing provides fast and accurate information of the constitution of bee pastures. Such procedures are considered extremely important for species of bees created rationally in the Amazon region.

Acknowledgment

Apimondia
Ukraine 2013

INPA
INSTITUTO NACIONAL DE PESQUISAS DA AMAZÔNIA

CNPq
Conselho Nacional de Desenvolvimento Científico e Tecnológico

UNICAMP