UNIVERSIDADE FEDERAL DO PARANÁ

MURILO MENCK GUIMARÃES

INTERAÇÕES ENTRE FLORES DE ÓLEO E VISITANTES FLORAIS: PADRÕES DE INTERAÇÃO, USO DE RECURSOS, TENDÊNCIAS E PERSPECTIVAS FUTURAS

CURITIBA

2020

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Dissertação apresentada como requisito para a obtenção do título de Mestre pelo Programa de Pós-Graduação em Botânica, Setor de Ciências Biológicas, Universidade Federal do Paraná.

Orientador: Dr. Fabiano Rodrigo da Maia

Co-orientadora: Dra. Camila Silveira de Souza

CURITIBA

2020

Universidade Federal do Paraná
Sistema de Bibliotecas
(Giana Mara Seniski Silva – CRB/9 1406)

Guimarães, Murilo Menck
Interações entre flores de óleo e visitantes florais : padrões de interação, uso de recursos, tendências e perspectivas futuras. / Murilo Menck Guimarães. – Curitiba, 2020.
220 p.: il.

Orientador: Fabiano Rodrigo da Maia.
Coorientadora: Camila Silveira de Souza.

Dissertação (mestrado) - Universidade Federal do Paraná, Setor de Ciências Biológicas. Programa de Pós-Graduação em Botânica.

1. Interação animal -planta. 2. Flores. 3. Polinização por insetos. 4. Abelha. I. Título. II. Maia, Fabiano Rodrigo da. III. Souza, Camila Silveira de. IV. Universidade Federal do Paraná. Setor de Ciências Biológicas. Programa de Pós-Graduação em Botânica.

CDD (22. ed.) 581.7

MINISTÉRIO DA EDUCAÇÃO
SETOR DE CIÊNCIAS BIOLÓGICAS
UNIVERSIDADE FEDERAL DO PARANÁ
PRÓ-REITORIA DE PESQUISA E PÓS-GRADUAÇÃO
PROGRAMA DE PÓS-GRADUAÇÃO BOTÂNICA - 40001016004P9

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AGRADECIMENTOS

Os meus mais sinceros agradecimentos a todos que me ajudaram até aqui, sem os quais não teria sido fácil a realização deste sonho.

Agradeço a toda minha família pelo apoio e incentivo para a realização desse sonho, e em especial aos meus pais, José e Sandra, que me ensinaram a importância e o respeito com os estudos, e a minha irmã, Milena, pelo apoio e carinho.

Agradeço a todos os meus professores, e em especial aos meus professores da graduação, Dr. Rafael Zampar e Dr. Cassius Santanna, que me incentivaram a seguir carreira acadêmica e me proporcionaram oportunidades de aprendizado prático com pesquisas na área da biodiversidade, e aos meus orientadores, Dr. Fabiano Rodrigo da Maia e Camila Silveira de Souza, por todos os ensinamentos ampliando meus horizontes como biólogo.

Agradeço a Karina Miliato e a Maria Rosângela Sigrist pelo banco de dados de interações de Malpighiaceae, e pelo auxílio durante o desenvolvimento do meu trabalho.

Agradeço a todos os meus amigos pelo apoio, incentivo e por toda a convivência pessoal. Em especial: Ana Lucia, Bruno, Danilo, Eduardo, Gabriela, Gabriel, Maurício, Miguel, Robin e Valdinei.

Agradeço a CAPES pela concessão de bolsa de pesquisa, sem o qual essa realização não seria possível. Espero do fundo do meu coração que os tempos turbulentos para a pesquisa brasileira cessem o mais rápido possível, e que os órgãos fomentadores proporcionem muitos outros a realizar o mesmo sonho.

Agradeço a UFPR pela estrutura e aos professores e funcionário do Departamento de Botânica pelos ensinamentos, principalmente por manter uma excelente estrutura em tempos de constantes ataques à educação e pesquisa brasileira.

"...não é nosso papel dominar todas as marés do mundo, e sim fazer o que está em nós para socorro dos anos em que fomos postos, extirpando o mal nos campos que conhecemos, para que os que viverem depois tenham terra limpa para cultivar"

Gandalf, o Branco

RESUMO

Os recursos florais suprem diversas necessidades dos visitantes florais. Entre essas necessidades, a alimentação têm sido a principal indutora da visitação floral. Assim, pólen e néctar possuem grande foco nos estudos das interações planta-polinizador pela importância que possuem no suprimento alimentar. Entretanto, o óleo floral também é utilizado para a alimentação das larvas de espécies de abelhas solitárias, além de ser utilizado no revestimento de seus ninhos. Esse recurso é produzido e armazenado em glândulas especializadas encontradas em 11 famílias diferentes, com maior representatividade na região Neotropical. As interações entre flores de óleo e visitantes florais têm sido bem relatados em nível populacional. Já em nível comunitário, poucos estudos têm descrito padrões das interações de óleo, e comumente negligenciam grupos taxonômicos menos representativos e visitantes florais que não coletam o óleo floral. Dessa forma, o presente estudo teve como principal objetivo compilar as interações entre flores produtoras de óleo e seus visitantes florais nos biomas mundiais e avaliar os padrões e determinantes dessas interações através da abordagem de redes complexas. Assim, identificamos uma meta-rede modular das interações de óleo nos biomas mundiais, ou seja, compartimentos são formados por espécies que interagem mais fortemente entre si do que com outras espécies. Apesar dos biomas mundiais terem influenciado a formação dos módulos (principalmente as macrorregiões), as famílias botânicas foram os principais responsáveis pela modularidade, indicando uma conservação filogenética de nicho de interações. Além disso, também identificamos organização núcleo-periferia, ou seja, existe um subgrupo de espécies altamente conectadas, que anexam um subgrupo de espécies frouxamente conectados na meta-rede. Espécies de Malpighiaceae e abelhas coletoras de óleo da tribo Centridini (subfamílias Apinae) foram as principais espécies com papeis funcionais na estrutura modular e organização núcleo-periferia da meta-rede. Assim, os resultados descritos aqui, mostram que grupos taxonômicos exercem grande influência na meta-rede de interações de óleo nos biomas mundiais, e que espécies de Malpighiaceae e Centridini são de fundamental importância para a coesão dessas interações em ampla escala geográfica.

Palavras-chave: abelhas coletoras de óleo, biomas mundiais, estrutura modular, meta-rede de interações, organização núcleo-periferia.

ABSTRACT

Floral resources supply the diverse needs of floral visitors. Among these needs, food has been the main driver of floral visitation. Thus, pollen and nectar have a great focus on studies of plant-pollinator interactions for their importance in the food supply. However, floral oil is also used to feed larvae of solitary bee species, in addition to being used to coat their nests. This resource is produced and stored in specialized glands found in 11 different families, with greater representation in the Neotropical region. The interactions between oil-producing flowers and floral visitors have been well reported at the population level. At the community level, few studies have described patterns of oil interactions, and commonly neglect less representative taxonomic groups and floral visitors who do not collect floral oil. Thus, the present study had as main objective to compile the interactions between oil-producing flowers and their floral visitors in the world biomes and to evaluate the patterns and determinants of these interactions through the approach of complex networks. Thus, we identified a modular meta-network of oil interactions in world biomes, that is, compartments are formed by species that interact more strongly with each other than with other species. Even though world biomes have influenced the formation of modules (mainly macro-regions), plant families were the main ones responsible for modularity, indicating phylogenetic conservation of niche interactions. In addition, we also identified core-periphery organization, that is, there is a subgroup of highly connected species, attaching a subgroup of loosely connected species in the meta-network. Species of Malpighiaceae and oil-collecting bees from the Centridini tribe (subfamilies Apinae) were the main species with functional roles in the structuring of the meta-network. Thus, the results described here show that taxonomic groups have a great influence on the meta-network of oil interactions in world biomes and that species of Malpighiaceae and Centridini are of fundamental importance for the cohesion of these interactions on a wide geographical scale.

Keywords: core-periphery organization, interaction meta-network, modular structure, oil-collecting bees, world biomes.

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INTRODUÇÃO GERAL

Os recursos florais oferecidos pelas flores (e.g. pólen, néctar, óleo, tecidos vegetais) são utilizados pelos visitantes florais para diversas finalidades (e.g. alimentar, nidificação, reprodução), e possuem uma grande importância no estabelecimento das interações de polinização (Simpson & Neff, 1981; Agostini *et al*., 2014), garantindo assim, a reprodução dessas espécies ao transferir o grão de pólen para o estigma das flores (Vizentin-Bugoni *et al*., 2018). Entre esses recursos, o pólen e o néctar são os mais investigados, provavelmente pela importância que possuem no suprimento alimentar para diversas espécies de animais como, por exemplo, abelhas e beija-flores (Simpson & Neff, 1981; Buchmann, 1987; Bezerra *et al*., 2009; Agostini *et al*., 2014). Entretanto, muitos outros recursos florais existem, servindo como atrativos para diversas espécies de animais que atuam como polinizadores (Buchmann, 1987). Entre esses recursos estão os óleos florais, substâncias naturalmente não voláteis que são produzidas e armazenadas em estruturas glandulares especializadas denominadas de elaióforos, podendo ser classificados como elaióforo epitelial ou elaióforo tricomático (Agostini *et al*., 2014, Possobom & Machado, 2017).

Desde a primeira descrição do óleo floral como recurso para os visitantes florais, a composição de famílias incluídas no grupo polifilético conhecido como "flores de óleo" foi constantemente alterado por novas descobertas e mudanças taxonômicas (APG II, 2003; Possobom & Machado, 2017). Atualmente, estima-se entre 1.500 e 1.800 espécies de flores produtoras de óleo pertencentes à onze famílias botânicas: Calceolariaceae, Iridaceae, Krameriaceae, Malpighiaceae, Orchidaceae, Plantaginaceae, Scrophulariaceae e Solanaceae distribuídas na região Neotropical (Cocucci, 1991; Vogel e Machado, 1991; Anderson, 2006; Goldblatt e Manning, 2006; Pansarin e Pansarin, 2011; Martins e Alves-dos-Santos, 2013); Primulaceae na região Holoártica (Anderberg *et al*., 2007); e Cucurbitaceae, Iridaceae, Orchidaceae, Scrophulariaceae e Stilbaceae na região Paleotropical (Vogel, 1981; Steiner, 1990; 1998; 2010; Steiner & Whitehead, 1991; Manning & Goldblatt, 2002; Pauw, 2006). Esse grupo inclui apenas as famílias que possuem estudos que esclareceram a importância ecológica do óleo floral para as flores produtoras de óleo e investigações sobre a sua produção e o armazenamento (Dafni *et al*., 2005). Dessa maneira, Fabaceae, Gesneriaceae e Melastomataceae, que também possuem espécies com óleo floral, não são consideradas como "flores de óleo" devido a lacunas na

literatura que impedem um melhor esclarecimento sobre o tema (Buchmann & Buchmann, 1981; Steiner, 1985; Vogel, 1988; Agostini *et al*., 2014; Possobom & Machado, 2017).

O óleo produzido pelas "flores de óleo" atua como atrativo primário para algumas espécies de abelhas (Possobom & Machado, 2017), um importante grupo na polinização das espécies vegetais por transportarem proporções maiores de pólen coespecífico, além de serem intimamente dependentes dos recursos florais para a sua sobrevivência (Alárcon, 2010; Pinheiro *et al*., 2014). O óleo floral é um recurso crucial para abelhas solitárias que alimentam as larvas com uma mistura deste recurso com o pólen (Simpson & Neff, 1981; Buchmann, 1987), além de utilizá-lo no revestimento de seus ninhos conferindo proteção contra a umidade (Cane *et al*., 1983; Buchmann, 1987; Alves-dos-Santos *et al*., 2007). As abelhas coletoras de óleo se distribuem amplamente pelo globo, da mesma maneira que as flores produtoras de óleo, ocorrendo nas tribos Centridini, Tapinotaspidini e Tetrapediini (subfamília Apinae) na região Neotropical, e Ctenoplectrini (subfamília Apinae) e subfamília Melittinae na região Holoártica e Paleotropical (Alves-dos-Santos *et al*., 2007; Possobom & Machado, 2017). Essas espécies de abelhas apresentam cerdas modificadas nos basitarsos anteriores, médios, ou no abdômen que as permitem extrair e manipular o óleo floral (Buchmann, 2004; Alves-dos-Santos *et al*., 2007; Agostini *et al*., 2014).

A ecologia das interações de óleo já foi bem documentada em níveis populacionais (Machado, 2004), com Malpighiaceae sendo a família mais investigada, devido, principalmente, a sua alta representatividade no grupo das "flores de óleo" (Possobom & Machado, 2017). Já no nível de comunidade, poucos estudos têm utilizado uma abordagem de redes complexas de interações buscando a identificação dos padrões das interações de óleo em redes locais identificando uma estrutura aninhada, isto é, interações específicas sendo subconjuntos de interações mais generalistas, que por sua vez são subconjuntos de interações ainda mais generalistas (Jordano *et al*., 2003; Bezerra *et al*., 2009; Genini *et al.*, 2010; Mello et al., 2013). Outro padrão que tem sido comumente relatado em redes locais de interações de óleo é a modularidade, padrão estrutural em que as interações formam módulos de espécies que interagem mais fortemente entre si do que com outras espécies, (Olesen *et al*., 2007; Bezerra *et al*., 2009; Mello et al., 2013). No entanto, quando a abordagem de rede é utilizada com um maior enfoque nas interações de óleo, as investigações tendem a ignorar espécies de famílias que não sejam

Malpighiaceae e espécies de animais que não coletam óleo, comprometendo o entendimento das interações de óleo em um nível comunitário.

Dessa maneira, a presente dissertação toma como foco para a pesquisa as interações entre flores produtoras de óleo e seus visitantes florais nos biomas mundiais, contando com um capitulo único que objetiva a descrição e identificação dos padrões e determinantes das interações de óleo em uma ampla escala geográfica, através da construção de uma meta-rede de interações de óleo com base na compilação sobre o que é conhecido na literatura.

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Assessment of interactions between oil-producing flowers and floral visitors in world biomes

Murilo Menck Guimarães[1,5], Camila Silveira Souza[1], Maria Rosângela Sigrist[2], Karina Back Militão Miliato[3], Fabiano Rodrigo da Maia[1,4]

[1] Programa de Pós-Graduação em Botânica, Departamento de Biologia, Universidade Federal do Paraná, Curitiba, PR, Brazil.

[2] Laboratório de Polinização, Reprodução e Fenologia de Plantas, InBio, Universidade Federal de Mato Grosso do Sul, Campo Grande, MS, Brazil.

[3] Programa de Pós-Graduação em Biologia Vegetal, Laboratório de Polinização, Reprodução e Fenologia de Plantas, InBio, Universidade Federal de Mato Grosso do Sul, Campo Grande, MS, Brazil.

[4] Departamento de Biologia Geral, Laboratório de Morfoanatomia Vegetal, Universidade Estadual de Ponta Grossa, PR, Brazil.

5 Corresponding author: murilomenck@gmail.com

Abstract: Specialized glands that produce and store floral oil are found in 11 plant families, with greater representation of Malpighiaceae. Solitary bees use this resource to feed larvae and cover nests. Oil interactions have been reported, mainly at the population level, with scarce community studies that usually do not take into account the fewer representative families of oil-producing flowers and also the floral visitors that do not collect floral oil. Thus, we compiled and examined the interactions between oil-producing flowers and floral visitors in world biomes, with the aim of describing the structural patterns of the oil interaction meta-network and of evaluating the functional role of the species. We reviewed 161 studies, which mainly used a phytocentric approach, reporting 1.402 interactions between 204 species of oil-producing flowers and 358 species of floral visitors. Species of Malpighiaceae were the most frequently investigated, as were bee species (mainly oil collectors). The meta-network of oil interactions presented a modular structure, mainly influenced by plant families, and core-periphery organization. The most important functional roles were associated with Malpighiaceae flowers, due to their representativeness and geographical distribution, and with bees closely related to oil collection.

Keywords: core-periphery organization, interaction meta-network, Malpighiaceae, modular structure, oil-collecting bees.

Introduction

Floral nectar is the primary reward offered to pollinators in the majority of angiosperms, and its amount, composition and placement is clearly an important determinant of plant-pollinator interactions (Parachnowitsch *et al.*, 2019). However, flowers can offer other resources, including the floral oil. Among all the resources offered by plant species, floral oil is a naturally non-volatile substance produced and stored in specialized glandular structures called elaiophores, which are classified as epithelial or trichomal (Agostini *et al.*, 2014; Possobom & Machado, 2017). Since the discovery of floral oil (see Vogel, 1988), the composition of the polyphyletic group known as “oil flowers” has changed. Currently, the list of “oil flowers" considers only families in which the production and storage of floral oil has been elucidated and that clearly shows the ecological importance of this oil in the breeding system of these species (Dafni *et al.*, 2005). Thus, “oil flowers” included 11 families with approximately 1.800 oil-producing

species, with Malpighiaceae the most representative family of oil-producing flowers (Machado, 2004; Renner & Schaefer, 2010). Floral conservatism in Neotropical Malpighiaceae species is a result of co-evolution with specialized pollinators, conserving floral traits related to the behaviour of oil-collecting bees during interaction (e.g. floral arrangement, standard petal, elaiophore) (Anderson, 1979, Davis & Anderson, 2010).

Floral oil was a resource that emerged divergently in several families throughout the life history of angiosperms, in parallel with pollinators' behaviour in the collection of floral oil (Renner & Schaefer, 2010). Therefore, oil-producing flowers occur practically all over the globe, but with greater abundance in the Neotropical region (Buchmann, 1987). In this region, oil-producing flowers occur in species of Calceolariaceae, Iridaceae, Krameriaceae, Malpighiaceae, Orchidaceae, Plantaginaceae, Scrophulariaceae and Solanaceae families (Cocucci, 1991; Vogel & Machado, 1991; Anderson, 2006; Goldblatt & Manning, 2006; Pansarin & Pansarin, 2011; Martins & Alves-dos-Santos *et al*., 2013). In the Holtartic region, oil-producing flowers species are recorded in Primulaceae (Anderberg *et al*., 2007), and in the Paleotropical region they are recorded in Cucurbitaceae, Iridaceae, Orchidaceae, Scrophulariaceae and Stilbaceae (Vogel, 1981; Steiner, 1990; 1998; 2010; Steiner & Whitehead, 1991; Manning & Goldblatt, 2002; Pauw, 2006).

Floral oil is gathered by solitary bee species from the Centridini, Ctenoplectrini, Tapinotaspidini and Tetrapediini tribes (subfamily Apinae) and the subfamily Melittinae (Possobom & Machado, 2017). These bees, mainly females, extract and manipulate the floral oil with modified brushes on the abdomen or the front and/or middle legs (Buchmann, 2004; Alves-dos-Santos *et al*., 2007; Agostini *et al*., 2014), mixing oil and pollen to feed the larvae (Simpson & Neff, 1981; Buchmann, 1987). In addition, as oil-collecting bees commonly nest in the soil, these bees use floral oil to coat their nests, providing protection from moisture (Cane *et al*., 1983; Buchmann, 1987; Alves-dos-Santos *et al*., 2007; Agostini *et al*., 2014). In this way, oil-producing flowers and their pollinators are closely linked, generating exclusive dependence (Vogel, 1990). However, despite the specialization between these groups of species, oil interactions occur superposed to other interactions, since several animal species visit oil-producing flowers in search of other resources (e.g. pollen, nectar, floral tissues). Indeed, investigations in local communities have shown that interactions between oil-producing flowers and oil-collecting bees represent a compartment of interactions within the community (Bezerra

et al., 2009). Despite the clear importance and distribution of these interactions across the world, we still have little information compiled about where and how these interactions are concentrated, and which plant species and visits have an important role in maintaining these interactions on broader scales.

If we identify different communities in which these interactions are distributed, oil-producing flowers can co-occur in these communities and share their interactions, forming a complex network of interactions. Some studies have identified a nested structure in interaction networks between Malpighiaceae and bees (e.g. Bezerra et al., 2009; Genini *et al*., 2010; Mello et al., 2013), indicating that the interactions of specialized species are subsets of interactions of the most generalist species in the network (Bascompte *et al*., 2003; Almeida-Neto & Ulrich, 2011). Recent studies have shown that the hierarchy of subsets of interactions quantified by nesting characterizes specialized species interacting with a core of generalist species (Bascompte *et al*., 2003; Vázquez & Aizen, 2004; Miele *et al*., 2020). In this way, investigations of plant-pollinator interactions started to consider the core-periphery organization, which returns a similar index to nesting despite not quantifying the hierarchy of subgroups, and allows the evaluation of highly connected species (core), attaching loosely connected species (periphery) to the network (Lee, 2016; Martín-González *et al*., 2020; Miele *et al*., 2020).

Studies also identified modular structure in Malpighiaceae-bees interaction networks, which quantifies the occurrence of groups of species that interact more intensively with each other than with other species in the network, forming interaction modules (Olesen *et al*., 2007a). Generally, these modules are related to characteristics shared by some species that may include morphological, phenological and spatial overlap, visiting behaviour and even phylogeny (Olesen *et al*., 2007a; Vázquez *et al*., 2009). In addition to these factors, spatial co-occurrence and the correspondence of characteristics possibly have some structural determinants in plant-pollinator interactions on a comprehensive spatial scale (Araujo *et al*., 2018; Nascimento *et al*., 2020). However, when the focus of the studies is on oil interactions, investigations tend to ignore not only the groups of animals that do not collect floral oil but also the oil-producing flower species that are from families other than Malpighiaceae, compromising our understanding of the structure of oil interactions and their determinants. Thus, it is necessary to take a broader approach to the interactions between all oil-producing flower species and their floral visitors.

To understand how oil interactions are organized on a broad spatial scale meta-network and which species are most important to their structure, we have compiled and examined studies in the literature on the interactions between oil-producing flowers and floral visitors in different world biomes. We expect the meta-network of interactions between oil-producing flowers and their floral visitors to be modular structure, with modules (groups of species that interact more strongly with each other) expressing plant families (attributes conserved at the family level) and world biomes (species co-occurring biomes). Also, we expect a core-periphery organization, having a subgroup pf species responsible for the adhesion of interactions loosely connected to the meta-network. Regarding the species level, we expect the Malpighiaceae species and floral visitors closely related to the collection of floral oil have functional roles in both investigated structures of the meta-network. Specifically, we are trying to answer the following questions: (1) How are studies on interactions between oil-producing flowering plants and their floral visitors distributed over time and in the world's biomes? (2) Among floral visitors, what is the percentage of interactions involving oil-collecting bees? (3) What are the main determinants of the modules formation? (4) Which species have functional roles in the connectivity between and within modules of this meta-network? (5) Which species are most important in the connection (core) of loosely connected species (periphery) to the meta-network? We consider that, by taking one of the most specific interactions with representative biodiversity worldwide, especially in the Neotropical region, the reported findings will allow a better understanding of the patterns and the importance of these interactions in communities.

Material and methods

Data survey

We compiled studies on the interactions between oil-producing flowers and floral visitors in world biomes, limited to studies published up to December 2019, through a comprehensive review of the literature (following proposed by Nascimento *et al.*, 2020). The search for studies was in the Web of Science (https://login.webofknowledge.com/), Scopus (https://www.scopus.com/), Google Scholar (https://scholar.google.com.br/) and Scielo (http://www.scielo.br/) databases using combinations of the following keywords in English: “oil-flowers”, “interactions”, “oil-producing plants”, “pollinators” and “oil-

collecting bees". In addition to the data compiled by the literature review, we inserted in our analysis an unpublished database of interactions between species of Malpighiaceae and their floral visitors. These interactions were sampled in one remnant of *cerrado* belonging to the *Reserva Particular do Patrimônio Natural da Universidade Federal de Mato Grosso do Sul* (RPPN/UFMS) (20°30'S, 54°36'W), in Campo Grande, Mato Grosso do Sul, Brazil. The remnant covers about 40 ha and the climate of the region can be classified as Aw (Tropical with dry winter) (*sensu* Köppen *apud* Alvares *et al*., 2013). The complementary database consists of six species of Malpighiaceae (*Banisteriopsis aphrodisiaca*, *Ba. argyrophylla*, *Byrsonima intermedia*, *Peixotoa reticulata*, *Diplopterys pubipetala* and *Heteropterys argyrophae*) visited by 56 animal species divided into eight groups (ants, bees, beetles, butterflies, crickets, flies, hemiptera and wasps) (Miliato, 2018). This database had a phytocentric approach, recording interactions through direct visual observations, photographic records and filming. The floral visitors sampled are deposited in the Zoological Collection of the *Universidade Federal do Mato Grosso do Sul* (ZUFMS).

From each of the reviewed studies, we extracted the oil-producing flower species and the floral visitors, considering only interactions where the interacting species were identified at the species level to avoid the inclusion of duplicates in our analyses. In addition, we only consider taxonomic groups known or suspected of producing floral oil according to Possobom & Machado (2017). After compiling the data, we checked and updated the scientific nomenclature, and the plant species were checked according to The Plant List (http://www.theplantlist.org/). For animals, we checked bee species in Moure's Bee Catalogue (http://moure.cria.org.br/) following the classification proposed by Melo and Gonçalves (2005), and we used Catalogueoflife.org (2019) for other animal species. To classify and standardize the studies and data, we extracted some information. First, we extracted the country and geographic coordinates of the study area. We classified world biomes according to World Wild Life (https://www.worldwildlife.org/) and Olson *et al*. (2001). For each study, we extracted the year of publication and the language, and classified them as (1) scientific journals, (2) monographs, dissertations and theses, and (3) congress proceedings. We classified the sampling method as phytocentric or zoocentric, based on focal observation focused on plant or animal, respectively (Jordano, 2016). Moreover, we classified the floral type (e.g. tube, gullet, dish, bell, flag and brush) of plant species according to Machado & Lopes (2004) and Souza *et al*. (2018). We

classified whether the floral type of flower sampled is specialized and generalist when the floral arrangement is more closed (e.g. tube, gullet and flag), or open (e.g. dish, brush and bell), respectively, allowing visits by various species (Olesen *et al*., 2007b). As for floral visitors, we classified them according to their group (e.g. bees, beetles, flies, wasps), and bee species were classified in oil-collectors or not, according to Alves-dos-Santos *et al.* (2007). When the same data were used in different studies, we used only the original data source to avoid redundancy (Nascimento *et al.*, 2020).

Data analysis

We organized the data compiled by the literature review and the previously available database in a matrix of interactions between oil-producing flowers and floral visitors, containing plant species as rows and animals as columns. In this matrix, the interactions between pairs of species were binary, consisting of 1 when there was an interaction between species and 0 when there was not (Araújo *et al*., 2018; Nascimento *et al*., 2020). For a graphic representation of the meta-network, we used PAJEK software (http://pajek.imfm.si/doku.php?id=pajek).

Then, we calculated metrics that illustrate different structural properties of the meta-network. We calculated the modularity to characterize the interaction between oil-producing flowers and their floral visitors in the world biomes. The modularity of complex networks reflects the species that interact more strongly with each other than with other species in the network, forming modules (Olesen *et al*., 2007a). In addition, the modularity analysis allows the assessment of the roles of species through the identification of the importance of species in providing cohesion for the network (Olesen *et al*., 2007a; Araújo *et al.*, 2018). To calculate modularity, we used the Louvain method, as it is suitable for large data sets and optimizes modularity (Blondel *et al*., 2008; Carstensen *et al*., 2013). The Louvain algorithm detects small local modules in the network through the maximum gain of modularity with the relocation of each node and then uses these local modules in a new network. This will be done repeatedly until the maximum modularity is reached (Blondel *et al.*, 2008; Carstensen *et al*., 2013). For this, we use the "igraph" package in the R program (R Development Core Team, 2019). We graphically illustrated the difference in the diversity of oil-producing flowers, that is, families of oil-producing flowers, between the modules through Pearson's residues of the

chi-square test by a correlation matrix of the species composition of each group and the module's identity thought the "corrplot" package in R software (Wei & Simko, 2017). We did the same for floral visitors and biomes where interactions occurred.

In sequence, to assess the role of oil-producing flowers and floral visitors, we calculated two species-level indices from the modular conformation (see proceedings in Olesen *et al*., 2007a). We calculated their roles concerning the connection between the modules (*c*) of the meta-network, and the role within the modules (*z*) (Olesen *et al*., 2007a; Dormann & Strauss, 2014). We classified the species according to these values: "peripheral" (when the *c* value is less than 0.62 and the *z* value is less than 2.5), "module hubs" (when the *z* value is greater than 2.5 and the *c* value is less than 0.62), "connectors" (when the *z* value is less than 2.5 and the *c* value is greater than 0.62) and "network hubs" (when the *c* value is greater than 0.62 and the *z* value is greater than 2.5) (Olesen *et al*., 2007a).

In addition, we calculated, for the first time for oil-producing flower interactions, the core-periphery structure using the "Stochastic Block Model" (SBM) that groups links with an equivalent structural position, allowing the assessment of the core of species with a higher degree of interaction, attaching a periphery of poorly connected species to the meta-network (Martin-González *et al*., 2020; Miele *et al*., 2020). For this, we used the "econetwork" package in R program, which recognizes the core-peripheral structure when the interactions are described by four blocks whose species connectivity has an L distribution, that is, one block will be composed by species with high connectivity, one block will have species with lower connectivity, and the remaining two blocks will have species with intermediate connectivity (Martin-González *et al*., 2020). The core-peripheral index (CPness) is estimated by the number of interaction links within each block on the total number of links in the meta-network (Martin-González *et al*., 2020).

In addition, to minimize possible errors that may arise from the lack of a sampling design of the interaction records gathered from the literature, we tested whether the number of records of a species and the number of locations in which it was reported was positively related to the number of interaction partners (number of interactions of the species = degree) (Nascimento *et al.*, 2020). For this, we used a GLM with quasi-Poisson distribution with world biomes as fixed factors and the number of interaction partners for each species as the response variable (Zuur *et al*., 2009). To attain a significant value for the GLMs, we used the function Anova in R package "car" (Fox & Weisberg, 2011). The

same was done for plant families, with families as fixed factors and the number of interaction partners for each species as the response variable. We only considered families and biomes with 10 species or more in our analysis, to minimize the discrepancy in the number of studies that reported the species. Thus, Gesneriaceae, Krameriaceae, Melastomataceae, Primulaceae, Solanaceae and Stilbaceae were removed from the analysis of plant families, and Flood Grasslands, Mangroves and Temperate Coniferous Forests from the analysis of world biomes. All analyses described were conducted in R (R Development Core Team, 2019).

Results

We compiled 161 studies (see Appendix A). These studies were found mainly in scientific journals (83.1%), followed by dissertations and theses (15%) and congress proceedings (1.9%), published mainly in English (69.4%) followed by Portuguese (29.4%) and Spanish (1.2%). Regarding the spatio-temporal distribution of the studies of oil interactions, the Neotropical region was the most sampled, with investigations concentrated mainly in Brazil (70.3%), followed by Argentina (9.1%), South Africa (7.9%), Chile (4.3%), Panama (2.4%), Costa Rica, the United States (1.8% each), and Germany, Lesotho, Mexico and Peru (0.6% each) (Fig. 1A). Oil-producing flowers and their floral visitors were observed in 11 world biomes: Deserts (14%); Flooded Grasslands (2%); Mangroves (3%); Mediterranean Forests (5.5%); Montane Grasslands, Shrublands (7%); Temperate Broadleaf, Mixed Forests (4.5%); Temperate Coniferous Forests (0.5%); Temperate Grasslands (3.5%); Tropical Dry Forests (5.5); Tropical Grasslands (26%); and Tropical Moist Forests (30%) (Fig. 1B). The number of studies increased over the decades, the oldest revised study being published in the 1980s, with a greater concentration of studies published in the 2010s (Fig. 1C). Most investigations used a phytocentric approach (73.7%) to record interactions of "oil flowers", while 26.3% of the studies used the zoocentric approach (for more details see "Reference metadata" in Appendix B).

When disregarding records that did not identify species at the species level, compiled studies and the previously available database reported 204 species of oil-producing flowers. These species belonged to 12 families, 10 families included "oil flowers" and two additional families (Gesneriaceae and Melastomataceae):

Calceolariaceae (10.3%), Gesneriaceae (0.5%), Iridaceae (10.8%), Krameriaceae (1.5%), Malpighiaceae (46.6%), Melastomataceae (2%), Orchidaceae (7.4%), Plantaginaceae (6.4%), Primulaceae (1.5%), Schrophulariaceae (10.3%), Solanaceae (1.5%) and Stilbaceae (1.5%). In relation to the species floral type, we found mainly open floral types, dish (60.8%) and bell (2%), in Iridaceae, Krameriaceae, Malpighiaceae, Melastomataceae, Primulaceae and Solanaceae. Gullet (30.9%) and flag (6.4%) were included in closed floral types, occurring in Calceolariaceae, Gesneriaceae, Iridaceae, Orchidaceae, Plantaginaceae, Scrophulariaceae and Stilbaceae. Moreover, 2.9% of species offer nectar as a resource in addition to floral oil (for more details see "Plant metadata" in Appendix B).

Concerning floral visitors, 358 floral visitors were registered to interact with the oil-producing flowers, and these were from the following groups: ants (1.4%), beetles (1.1%), bees (91.9%), birds (0.3%), butterflies (0.8%), flies (1.1%) and wasps (3.4%). Among bee species, 79.3% are oil-collecting bees, from subfamily Melittinae (8.9%) and tribes Centridini (50.5%), Tapinotaspidini (36.8%) and Tetrapediini (3.7%). Beyond these bees, oil collections have been reported in species that are not considered oil collectors in Meliponini bees (*Frieseomelitta nigra*, *Leurotrigona muelleri*, *Paratrigona lineata*, *P. subnuda*, *Tetragona clavipes* and 8 *Trigona* spp.) and single Xylocopini bees (*Xylocopa hirsutissima*) (subfamily Apinae), and only ant species (*Pheidole gertrudae*) (for more details see "Animal metadata" in Appendix B).

Meta-network structure

In total, the matrix included 1402 links between oil-producing flowers and floral visitors, and the meta-network was modular ($Q = 0.53$), formed by 25 modules, of which 15 modules occurred isolated from the rest of the meta-network (Fig. 2). However, the oil-producing flower families were well distributed among the modules of the meta-network, so that 12 modules had at least two families (while the rest of the modules were isolated and composed of single interactions) ($X^2 = 1051.6$, $df = 264$, $p < 0.001$) (Fig. 3A). In addition, many modules have been associated with certain plant families (Fig. 3A). The same occurred with the world biomes, which were well distributed among the modules, with 11 modules owning interactions from different biomes ($X^2 = 969.16$, $df = 240$, $p < 0.001$) (Fig. 3B). In addition, the composition of the modules corresponded to

the biogeographical regions. Thus, two modules were constituted by interactions from the Neartic region (modules 2 and 13), one from the Paleartic region (module 12), six from the Paleotropic region (modules 10, 17, 18, 19, 20 and 21), a single module was made up of two biogeographic regions (Neartic and Neotropic) because of introduced bee species (*Centris nitida*) in Neartic (module 24), and the rest of the modules representing Neotropical interactions (for more details on the composition of the modules see appendix 2). Concerning floral visitors, oil-collecting bees were included in most of the modules of the meta-network, but the proportion between oil collectors and visitors that do not collect varied between the modules (Fig. 2).

As regards the role of species in the meta-network structure of the interactions between oil-producing flowers and their floral visitors, most species were classified as peripheral (90.57%) according to their values of *c* and *z* (connectivity between and within the modules, respectively). The remaining species were classified as connectors (6.05%), module hubs (2.85%) and network hubs (0.53%) (Fig. 4). Floral visitors with a role inside and between the modules were composed of oil-collecting bee species (80%) and bees that do not collect oil (20%). Centridini bees was the main group with functional roles in connectivity within and between modules (connectors, hub modules and hub network), while the other groups acted only as connectors (Table 1). The oil-producing flowers with a role within and between the modules were composed mainly of Malpighiaceae species (73.9%); other species capable of influencing the structure of the meta-network were from the families Gesneriaceae (4.35%), Krameriaceae (8.7%), Orchidaceae (4.35%) and Plantaginaceae (8.7%). Among oil-producing flowers, Malpighiaceae flowers was the main family with functional roles in connectivity within and between modules (connectors, hub modules and hub network), while Krameriaceae, Orchidaceae and Plantaginaceae acted as connectors, and Gesneriaceae as module hub (Table 2) (for more details see Appendix B).

The meta-network of interactions between oil-producing flowers and their floral visitors demonstrated a high core-periphery structure (CPness = 0.82). Thus, four blocks were identified with connectivity varying between a block with densely connected species and other blocks formed by species with a low degree of interaction, but which interact with the core species. Thus, the oil interaction meta-network has a core composed mainly of Malpighiaceae flowers and oil-collecting bees (Fig. 5). The plant species comprised 22% of the core species, including Malpighiaceae (88.7%); other species were

Gesneriaceae (2.7%), Krameriaceae (4.5%) and Plantaginaceae (4.5%) (Fig. 5A). The floral visitors comprised 11% of the core species, and the bee group was the most representative (97.5%), also including a single wasp species (2.5%) (Fig. 5B). Among the group of bees, oil-collecting bees were the main species included in the core, owning a greater representation of Centridini bees (67.5%), followed by Tetrapediini and subfamily Melitinae (5% and 2.5%, respectively) (Table 1).

In relation to the degree of interaction, studies in Deserts, Temperate Grasslands, Tropical Moist Forests and Tropical Grasslands presented a greater number of interaction partners, while Mediterranean Forest, Montane Grasslands and Shrublands, Temperate Broadleaf and Mixed Forests and Tropical Dry Forests had fewer interaction partners (x^2 = 623.27, df = 7, $p < 0.001$) (Fig. 6A). With regard to the degree of interactions of the plant families, Malpighiaceae and Plantaginaceae had a higher degree of interactions, and Calceolariaceae, Orchidaceae and Scrophulariaceae a lower degree of interactions (x^2 = 608.47, df = 5, $p < 0.001$) (Fig.6B).

Discussion

The meta-network of interactions between oil-producing flowers and floral visitors in world biomes presented a modular structure, in which the plant families were the main determinants for the identity of the modules. Furthermore, although most species played peripheral roles in the connectivity between and within modules, Malpighiaceae flowers and oil-collecting bees (mainly Centridini) had relevant functional roles (connectors, module hub and network hub) for the modular structure. Also, we identified core-periphery organization with Malpighiaceae flowers and Centridini bees being the most important groups in the connection of species loosely connected to the meta-network.

Meta-network structure

Modular structure has also been reported in other studies on local Malpighiaceae-bee interaction networks (Bezerra *et al*., 2009; Mello et al., 2013), although it is controversial in the literature, since the modular structure was not identified in the Malpighiaceae-floral visitors' network (Genini *et al.*, 2010). In this way, even with the

specialization between interacting species in networks of oil interactions, modules are formed by species that interact more strongly with each other. These modules have been related to the characteristics shared by some species in local interaction network, such as morphological, phenological and spatial coupling, visiting behaviour and even phylogeny (Olesen *et al.*, 2007a; Vázquez *et al.*, 2009). Here, when we consider the totality of oil-producing flowers and their floral visitors in a comprehensive geographic range, the correspondence of characteristics of oil-producing flowers families and the geographic distribution of these species were the main determinants for the modularity of the meta-network of oil interactions. In other words, species of oil-producing flowers and floral visitors formed compartments associated with plant families and the biomes where interactions occur in interaction meta-network between oil-producing flowers and floral visitors.

In the meta-network of interactions between oil-producing flowers and floral visitors, the world biomes influenced the modular conformation of the meta-network. Although the influence was less than we expected, it exerted a clear effect on a macroregional scale (Neartic, Neotropic, Paleartic and Paleotropic) in the structure of the oil interaction meta-network. This probably occurred due to the classification of biomes on a global level, so that the Neotropical region, which has a greater diversity of oil-producing flowers (Buchmann, 1987), encompasses a spatial complex formed by a mosaic of ecologically related phyto-physiognomies (Coutinho, 2006; Olson *et al*., 2001), owning little influence on the modular conformation of the meta-network. So that biogeographic factors exerting a greater influence on the modular conformation. The only exception was module 24, which had interactions from the Neartic and Neotropic region because of a Latin America bee species (*Centris nitida*) introduced in the United States (Downing & Liu, 2012), attaching Neartic interactions to a module but associated with Neotropical interactions.

Plant families were the main determinants for the conformation of modules, expressing the identity of groups of species that interact more strongly with each other than with other species in the meta-network. This occurs due to the high specialization among the oil-producing flowers and oil-collecting bees, because of the selective pressure associated with the supply and collection of floral oil (Anderson, 1979; Carneiro *et al*., 2015; 2019), keeping the floral conservatism of attributes in the plant families. Consequently, each oil-producing flower family had a positive correlation with some

module of the meta-network (Fig. 3A), even though most of the families found were distributed among different modules.

Moreover, we were the first to identify a core-periphery structure in the oil interaction between oil-producing flowers and floral visitors. The meta-network has a subgroup of species with a high degree of interaction, responsible for connecting loosely attached species to the rest of the meta-network, and this was identified by the core-periphery analysis. Interactions subgroups with highly connected species in mutualistic plant-pollinator interactions networks are of great importance for the community, because it minimizes disturbances with alternative routes, maintaining the cohesion and robustness of the network and avoiding extinction and loss of species (Bascompte *et al*., 2003; Bascompte & Jordano, 2007). In our meta-network, Malpighiaceae flowers and Centridini bees made up the core of species responsible for the cohesion of oil interactions on a wide geographical range, surrounded by a periphery of species that are little connected to the meta-network. This influence is a reflection of the evolutionary history of these species, since floral oil first appeared in Malpighiaceae flowers, and Centridini bees had important in the emergence of the ability to collect oil (Renner & Schaefer, 2010; Policarová *et al*., 2019). In addition, these are currently the most representative groups among oil-producing flowers and oil-collecting bees, with a wide distribution in the Neotropical region (Alves-dos-Santos *et al*., 2007; Giannini *et al*., 2013). Therefore, when considering the totality of interactions on a wide geographical scale, Malpighiaceae flowers and Centridini bees connect species with less widespread geographic distribution and less representative taxonomic groups to the meta-network.

Species roles

Although most species played peripheral roles, Malpighiaceae flowers and Centridini bees played important functional roles in connectivity between and within the meta-network modules. Thus, Malpighiaceae flowers and Centridini bees are important for maintaining the interactions between oil-producing flowers and oil-collecting bees. Also, it is important to note that oil-producing flowers from other families (Table 2) and oil-collecting bees from other tribes (Table 1) had functional roles in the modular structure and core-periphery organization. This is explained by the floral conservatism in

the plant families, and by the morphological adaptations related to the extraction and manipulation of the floral oil in these tribes. This pattern has already been reported in studies that investigated interactions between Malpighiaceae-Centridini (Mello *et al*., 2013) and fruit-bats (Mello *et al*., 2011), so that species with important central roles for the network has associated adaptations with the investigated interaction. Thus, the meta-network of interactions between oil-producing flowers and floral visitors will reflect the co-evolutionary history of the interacting species so that floral visitors closely related to oil collection will be the main species with functional roles in modular structure (connectors, module hub and network hub) and core-periphery organization (core). In addition, Malpighiaceae and Centridini species have significant diversity among oil-producing flowers and oil-collecting bees, and are reported on a wide geographical scale in the Neotropical regions (Bunchmann, 1987; Alves-dos-Santos *et al*., 2007; Geanini *et al*., 2013), factor identified as an important determinant for species with functional roles in plant-hummingbird interactions in Brazil (Araujo et al., 2018).

However, when considering the totality of floral visitors, some non-oil-collecting bee species played important roles in the modular structure (modular structure) and core-periphery organization (core) of the meta-network. Among these species were Meliponini bees were the most representative group (Table 1). Meliponini has been reported to collect floral oil, but they are not recognized in the literature as oil collectors because they do not have the necessary morphological adaptations for the extraction and handling of this resource (Buchmann, 1987; Alves-dos-Santos *et al*., 2007; Barônio & Torezan-Silingardi, 2016). Other species that do not collect oil had functional roles in the meta-network. This corroborates the growing evidence that suggests that mutualistic networks of plant-pollinators are structured by compartments of species that represent the phylogeny and specialization of interactions (Mello *et al*., 2013) so that species not related to floral oil and with functional roles will be important in the connectivity of oil interactions with the totality of plant-pollinator interactions.

The same occurred with *Drymonia serrula*, a flower in which the interaction of oil was observed but which is not included in the "oil flowers" group due to the lack of evidence about the location of production and storage of floral oil and the ecological importance of this resource. This species is more associated with nectar floral collectors (Steiner, 1985), being inserted in a module more associated with non-oil collectors (module 24). Also, *D. serrulata* playing a role as module hub, that is, having importance

in the connectivity of the within the module. Another family not included in "oil flowers" due to lack of evidence, was Melastomataceae, which had two species (*Mouriri guianensis* and *M. myrtilloides*) included in module 24 and two species (*Macairea radula* and *Tibouchina cerastifolia*) in module 7 (better associate oil-collecting bees), but all species had peripheral roles. This probably occurred because Melastomataceae is more adapted to buzz-pollination (Buchmann & Buchmann, 1981) not performing central roles in the structure of oil interactions.

Regarding the number of interaction partners of the oil-producing flowers rescued by our synthesis, we observed that Malpighiaceae, Plantaginaceae and Iridaceae had a greater degree of interaction (Fig. 6B). However, the degree of interaction does not follow the number of species studied in these families. The open floral type of Malpighiaceae flowers (disc flower type), which facilitates foraging on the flower for a greater number of species (Olesen *et al*., 2007b), can explain the high degree of interaction seen in this family. In relation to Plantaginaceae and Iridaceae (Fig. 6B), which also had a higher degree of interaction, these families have species that offer nectar in addition to floral oil, and they are visited by other animals besides oil-collecting bees and floral visitors who collect pollen. Regarding world biomes, the biomes that presented a greater degree of interaction (partners of interaction) or oil-producing flowers occurred mainly in the Neotropical region, with the Tropical Moist Forests, Tropical Grasslands and Desert biomes having a greater number of studies (Fig. 6A). However, even with the larger number of studies in these biomes, the Neotropical region has a greater diversity of oil-producing flowers and oil-collecting bees (Buchmann, 1987; Alves-dos-Santos *et al.*, 2007). It is a driver for investigations in these biomes, and consequently, presents a greater number of interaction partners for the oil-producing flowers in our synthesis.

Conclusion

When gathering information from studies on oil interactions in the main databases, we noted that the investigations tend to focus on families and biomes with a greater representation of oil-producing flowers, and commonly report these interactions at the population level. Thus, our synthesis evidenced a need to increase the sampling effort even at the population level, to fill gaps about less representative families within the “oil flowers” group and about species that occur in less representative biomes. In addition, we

found no record of interactions in oil-producing flowers in Cucurbitaceae. It is also necessary to increase information about the behaviour of floral visitors, to understand how antagonistic and mutualistic interactions affect the structural characteristics of oil interactions (Genini *et al*., 2010). The meta-network of oil interactions in world biomes was built mainly by information derived from phytocentric approaches, a pattern already reported in other studies (Vizentin-Bugoni *et al*., 2018; Nascimento *et al*., 2020). The reason for this trend is that the phytocentric approach is easier to apply in the field, in addition to the difficulty and laboratory demands involved in identifying pollen in the zoocentric approach (Vizentin-Bugoni *et al*., 2018; Nascimento *et al*., 2020). However, this approach can neglect rare and less accessible species (Vizentin-Bugoni et al., 2018); thus, future studies should consider a zoocentric approach. Also, it is necessary to investigate oil interactions at the community level, to assess whether the patterns and determinants found in the meta-network will persist in local networks.

Finally, we are aware that bringing together what is known to assess the patterns of the oil interaction meta-network does not represent all of the existing diversity of oil-producing flowers and their floral visitors. However, the results obtained here shed light on interactions between oil-producing flowers and floral visitors in world biomes. We demonstrate that family oil-producing flowers are the main determinants for modular conformation. At the species level, Malpighiaceae flowers and bees closely related to oil collection have important functional roles for the community, acting in modularity (acting as connector, hub module and network hub) and core-periphery organization (in the core subgroup). In addition, when we consider the totality of species involved, we observe that floral visitors who do not collect oil played functional roles in both structures (connectors in modularity and core subgroup), corroborating growing evidence that the plant-pollinator community is structured by a mosaic of phylogeny and specialized interactions (Mello *et al*., 2013). We hope that by demonstrating the main determinants of oil interactions our findings will contribute to the understanding of interactions between oil-producing flowers and floral visitors, and serves as a foundation for future work about plant-pollinator interactions on a large spatial scale.

Acknowledgements

The authors would like to thank Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES) for the master's degree scholarship for Murilo Menck

(88882.382587/2019-01) and post-doctoral scholarship for Camila Silveira Souza (88887.318827/2019-00). We also thank Daniel M. C. Alcantara for building the distribution map for studies of oil interactions.

Appendix

Appendix A – Revised literature

https://drive.google.com/file/d/13cOmSL-pnXO1euBo9crPZuoxG62IRMFy/view?usp=sharing

Appendix B – Revised data

https://drive.google.com/file/d/1iZ9TqQ789DiJBwTHryeTcJCpQbTHyxN-/view?usp=sharing

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Figures list

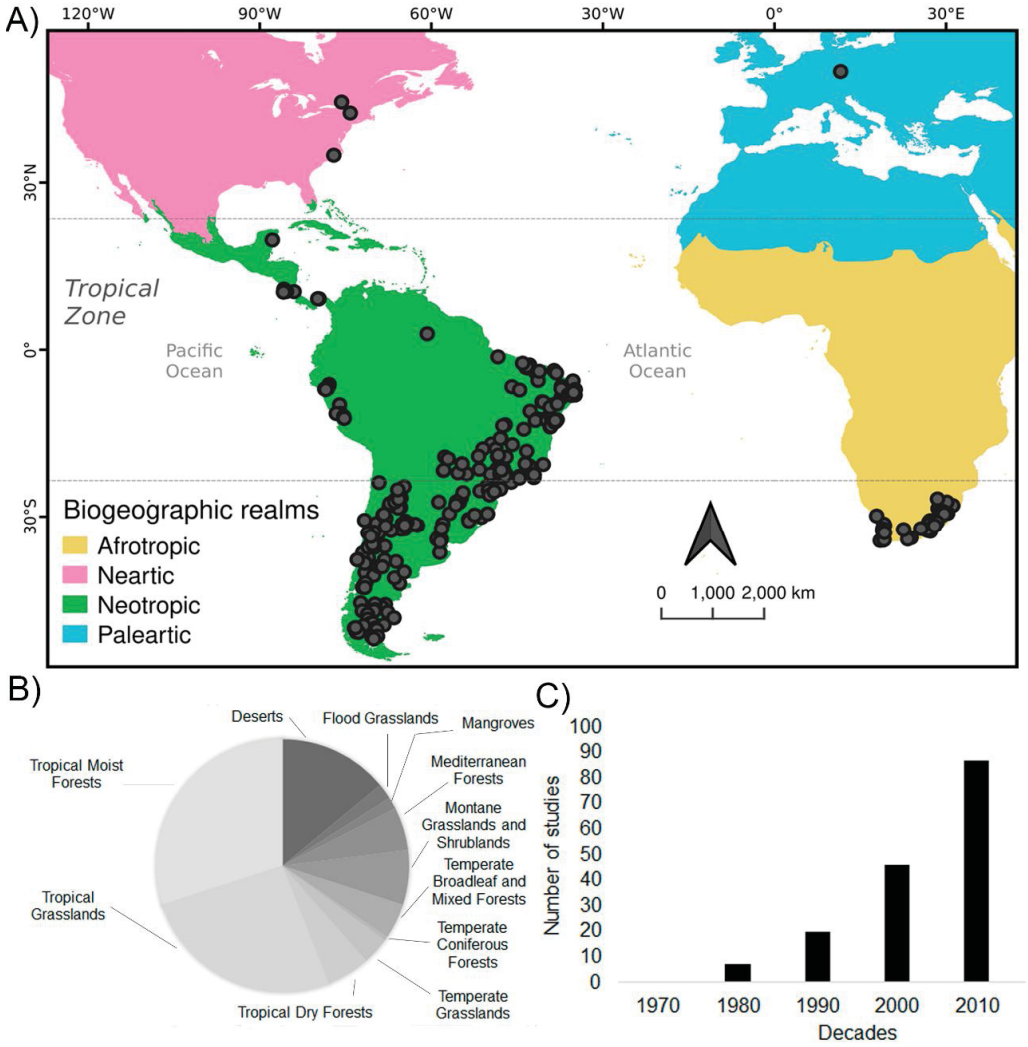

Figure 1: Spatio-temporal distribution of studies on interactions between oil-producing plants and floral visitors in world biomes. A) Studies distribution according to world macro-regions. Studies realized out in the same areas were superimposed on the map; B) World biomes in which investigations take place; C) Time trend in the number of publications per decade since the discovery of floral oil.

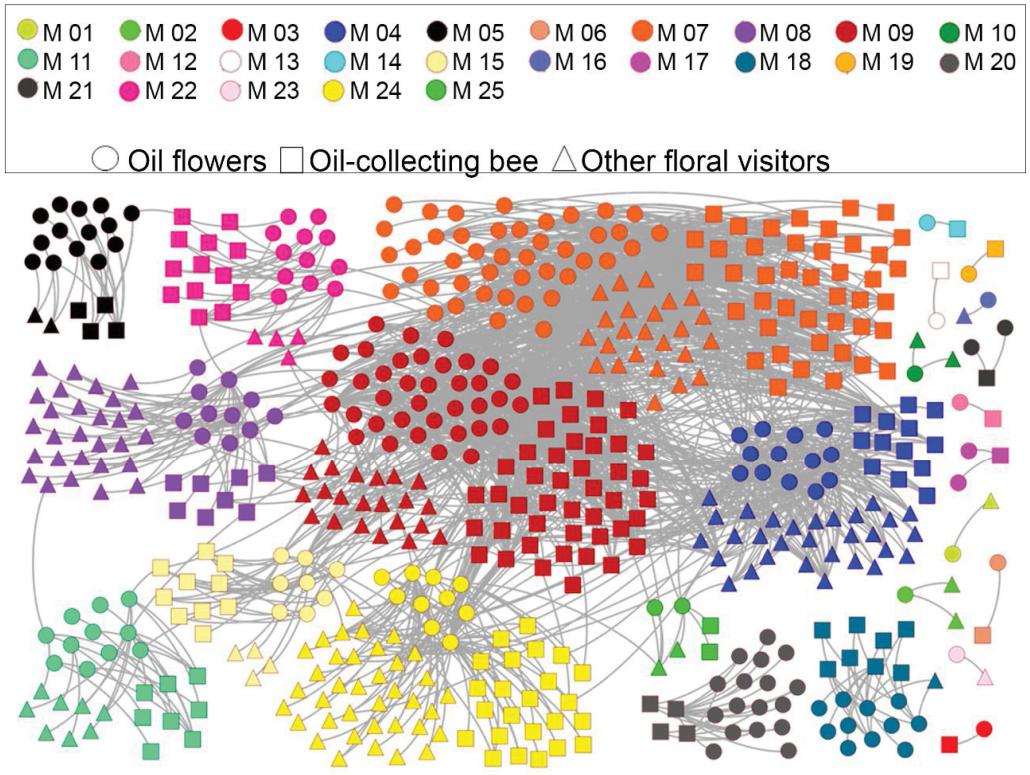

Figure 2: The modular structure of the meta-network of interactions between oil-producing flowers and their floral visitors in world biomes, where each color represents a module (M) (for more details see Appendix 2).

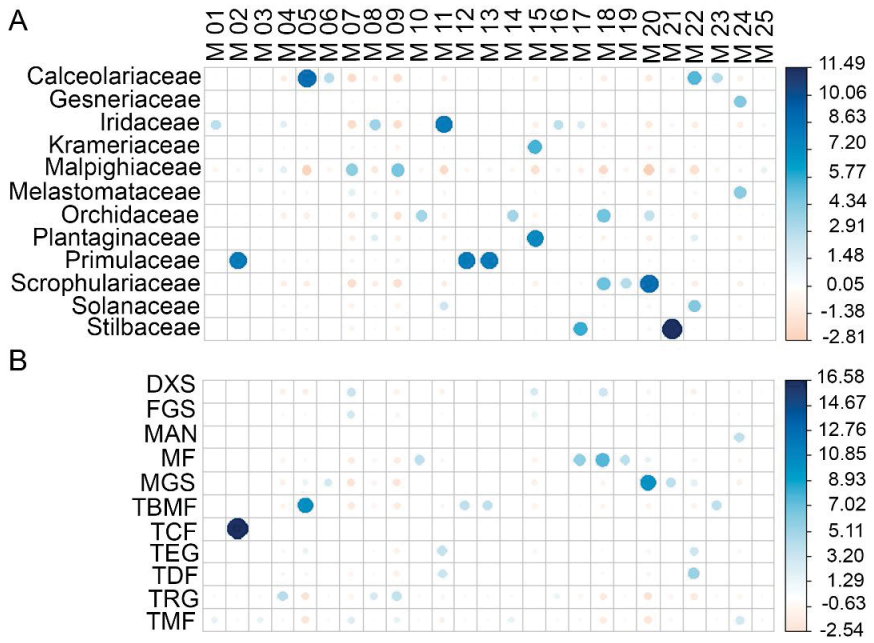

Figure 3: Correlation graph of the interaction meta-network modules between oil-producing flowers and their floral visitors in the world biomes, indicating a positive or negative association (blue and red circles, respectively) according to Pearson's residual values, demonstrating the association of the 25 modules (M) with A) composition of plant families, B) world biomes (DXS = Deserts; FGS = Flooded Grasslands; MAN = Mangroves; MF = Mediterranean Forests; MGS = Montane Grasslands and Shrublands; TBMF = Temperate Broadleaf and Mixed Forests; TCF = Temperate Coniferous Forests; TEG = Temperate Grasslands; TDF = Tropical Dry Forests; TRG = Tropical Grasslands; TMF = Tropical Moist Forests).

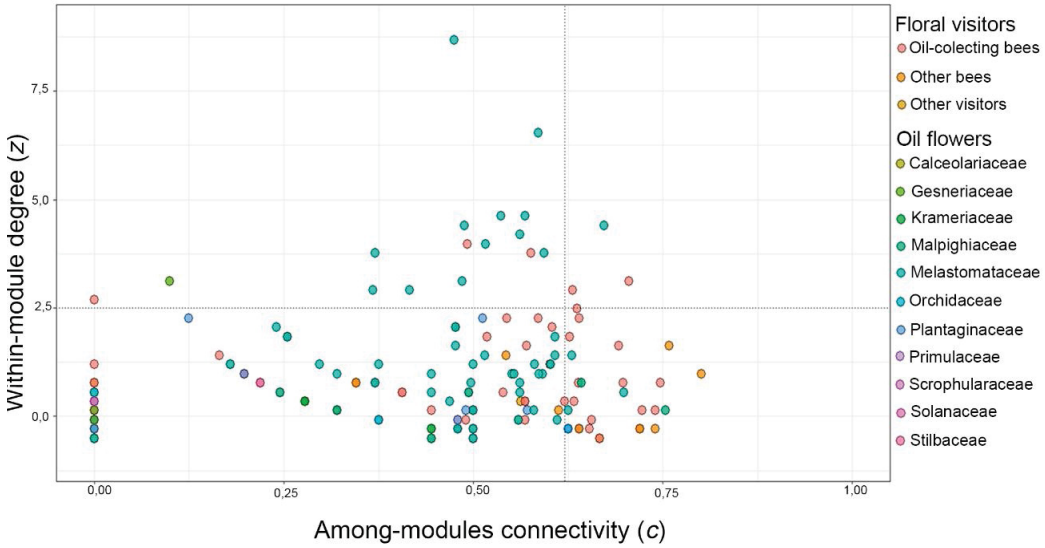

Figure 4: The distribution of species according to their degree values within modules (*z*) and the connectivity between modules (*c*), characterizing the roles of their species in the meta-network of interactions between oil-producing flowers and their floral visitors in world biomes. The threshold for defining the roles of species follows Olesen *et al*. (2007).

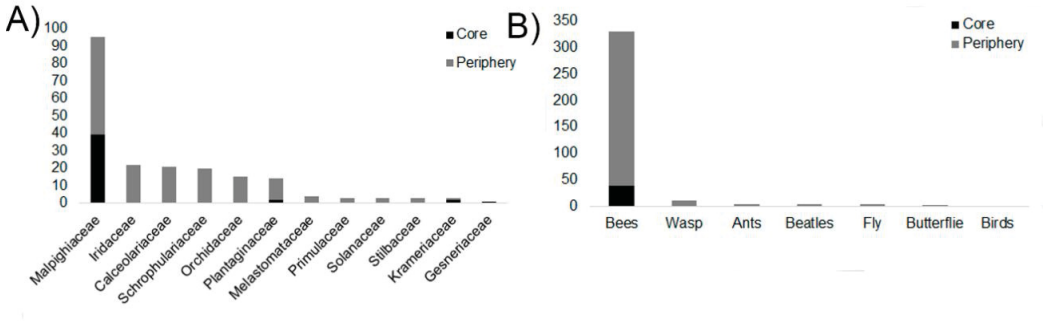

Figure 5: A) Composition of plant species in core and periphery subgroups. B) Composition of species of floral visitors in core and periphery subgroups.

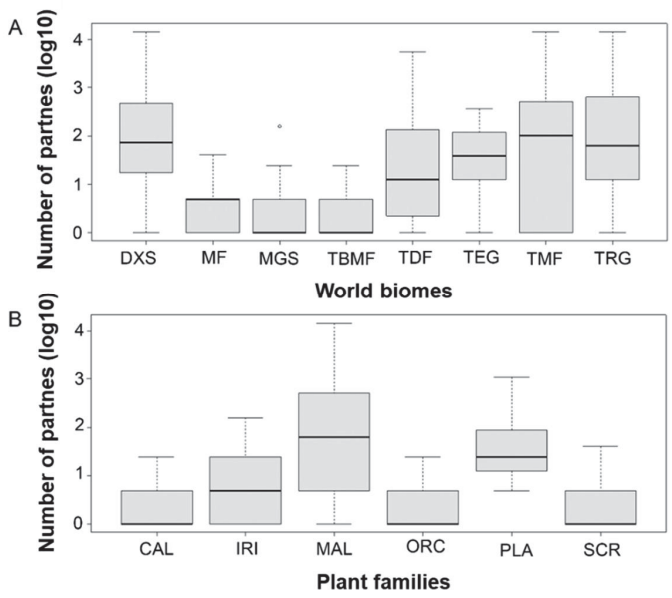

Figure 6: A. Number of interaction partners associated with oil-producing flowers in different world biomes (DXS = Deserts; MF = Mediterranean Forests; MGS = Montane Grasslands and Shrublands; TBMF = Temperate Broadleaf and Mixed Forests; TDF = Tropical Dry Forests; TEG = Temperate Grasslands; TMF = Tropical Moist Forests; TRG = Tropical Grasslands). B. Number of interaction partners associated with oil-producing flowers from plant families (CAL = Calceolariaceae; IRI = Iridaceae; MAL = Malpighiaceae; ORC = Orchidaceae; PLA = Plantaginaceae; SCR = Scrophulariaceae).

Figures list

Table 1 - Floral visitor with functional roles in the modular structure and core-periphery organization. (Resources collected: floral tissue = FT; not available = NA; nectar = N; oil = O; pollen = P)

Species	Resources collected	Degree	Species role in modularity	Core-periphery group	Reference ID (see appendix 2)
Oil-collecting bees					
APINAE					
CENTRIDINI					
Centris aenea	O, P	31	Network hub	Core	2, 4, 5, 9, 10, 19, 26, 27, 34, 35, 38, 40, 47, 48, 59, 61, 64, 65, 68, 74, 78, 87, 88, 89, 94, 97, 98, 101, 104, 108, 133, 135, 136, 141, 142, 150, 161
Centris bicolor	O	16	Peripheral	Core	26, 27, 27, 39, 40, 61, 73, 94, 97, 104, 129, 141
Centris burgdorfi	O,P	18	Connectors	Core	9, 10, 21, 26, 36, 61, 129, 141, 159
Centris caxiensis	O,P	28	Peripheral	Core	4, 5, 9, 10, 15, 17, 35, 48, 59, 137, 151, 160
Centris collaris	O,P	11	Peripheral	Core	39, 40, 57, 118, 141
Centris discolor	O,P	9	Peripheral	Core	40, 56, 83, 159
Centris flavifrons	O,P	27	Connectors	Core	4, 5, 9, 15, 27, 35, 38, 54, 59, 78, 88, 91, 97, 98, 99, 104, 108, 129, 131, 135, 138, 141, 147, 153, 160, 161
Centris fuscata	N, O, P	36	Module hub	Core	4, 5, 10, 15, 27, 38, 40, 57, 59, 61, 64, 68, 78, 84, 87, 88, 97, 98, 104, 129, 131, 133, 135, 138, 141, 150, 151, 160, 161
Centris longimana	O,P	12	Connectors	Periphery	27, 35, 47, 61, 94, 104, 108, 117, 141, 146, 154, 160
Centris lutea	O,P	9	Peripheral	Core	15, 17, 61, 131, 141, 146
Centris machadoi	O,P	3	Peripheral	Core	57, 58, 61
Centris moerens	O	2	Peripheral	Core	46, 47, 48
Centris nitida	O	2	Peripheral	Core	82, 85, 131
Centris rhodoprocta	O, P	29	Connectors	Periphery	26, 27, 34, 35, 39, 51, 53, 74, 75, 78, 86, 89, 94, 98, 102, 104, 106, 107, 108, 131, 141,

					142, 150, 152, 160, 161
Centris rupestris	NA	5	Connectors	Core	61
Centris similis	O	3	Peripheral	Core	39, 141
Centris spilopoda	N, O, P	10	Connectors	Periphery	9, 17, 27, 38, 47, 64, 78, 87, 97, 104, 108, 135, 141, 142, 144, 160, 161
Centris sponsa	O, P	16	Connectors	Core	15, 27, 35, 47, 48, 57, 58, 61, 87, 88, 98, 129, 141, 150
Centris tarsata	O, P	48	Network hub	Core	1, 4, 5, 9, 10, 19, 20, 21, 27, 35, 40, 45, 47, 51, 52, 59, 61, 68, 73, 74, 76, 83, 87, 89, 94, 97, 98, 99, 104, 129, 133, 141, 142, 150, 153, 160, 161
Centris terminata	P	3	Peripheral	Core	86
Centris trigonoides	O, P	23	Connectors	Periphery	5, 15, 20, 26, 27, 40, 59, 61, 68, 98, 117, 128, 129, 131, 133, 141, 142, 160
Centris vardyorum	O, P	1	Peripheral	Core	18, 77
Centris varia	O	18	Connectors	Periphery	25, 34, 38, 57, 61, 71, 74, 78, 89, 93, 94, 97, 99, 104, 108, 117, 129, 131, 138, 141, 153
Centris versicolor	NA	1	Peripheral	Core	147
Centris vittata	O	4	Connectors	Periphery	51, 104, 131
Epicharis affinis	O, P	19	Peripheral	Core	31, 39, 40, 61, 94, 97, 104, 108, 138, 141, 159
Epicharis analis	O, P	23	Peripheral	Core	13, 27, 31, 39, 40, 47, 48, 57, 58, 61, 64, 94, 97, 104, 138, 141, 146, 159
Epicharis bicolor	O, P	27	Connectors	Core	13, 27, 31, 47, 48, 57, 58, 61, 64, 78, 87, 89, 97, 104, 108, 113, 138, 141, 142, 150, 159, 160
Epicharis cockerelli	O, P	10	Connectors	Core	2, 31, 47, 48, 61, 94, 97, 104, 138, 141, 161

Epicharis flava	O, P	33	Module hub	Core	13, 25, 31, 34, 40, 57, 61, 64, 74, 78, 87, 89, 94, 97, 98, 99, 104, 108, 135, 138, 141, 142, 146, 150, 160, 161
Epicharis iheringii	O, P	16	Peripheral	Core	57, 58, 61, 97, 141, 146, 159
Epicharis maculata	O, P	4	Connectors	Periphery	74, 78, 117
Epicharis picta	O, P	9	Peripheral	Core	97, 138, 141, 159
Epicharis rustica	O, P	9	Peripheral	Core	39, 42, 117, 159
TAPINOTASPIDINI					
Arhysoceble dichroopoda	O, P	8	Connectors	Periphery	21, 56, 138, 140
Paratetrapedia punctata	O, P	7	Connectors	Periphery	26, 47, 56, 64, 87
Paratetrapedia testacea	O, P	3	Connectors	Periphery	13, 27, 160
Xanthopedia larocai	O, P	5	Connectors	Periphery	9, 25, 31, 38, 97
TETRAPEDIINI					
Tetrapedia amplitarsis	O	4	Connectors	Periphery	47, 48, 138
Tetrapedia diversipes	O, P	23	Peripheral	Core	8, 9, 27, 31, 32, 40, 44, 47, 51, 57, 58, 63, 74, 87, 89, 97, 138, 160
Tetrapedia rugulosa	O, P	13	Connectors	Core	39, 63, 133, 159
Subfamily MELITTINAE					
Rediviva neliana	O, P	16	Module hub	Core	119, 122, 123
Non-oil-collecting					
APINI					
Apis mellifera	P	28	Connectors	Core	3, 4, 5, 9, 15, 16, 18, 19, 25, 50, 56, 59, 71, 79, 80, 81, 82, 87, 88, 135, 146, 147, 153, 159, 161
AUGOCHLORINI					
Augochloropsis smithiana	P	9	Peripheral	Core	64, 74, 159
BOMBINI					
Bombus brevivillus	P	9	Peripheral	Core	81, 147, 159
Bombus morio	P	9	Peripheral	Core	81, 138, 159
Bombus pauloensis	P	5	Connectors	Periphery	56, 64, 129, 140
MELIPONINI					
Melipona quadrifasciata	P	3	Connectors	Periphery	93, 103, 138

Paratrigona lineata	O, P	19	Peripheral	Core	2, 25, 27, 31, 57, 64, 81, 140, 153, 159, 161
Tetragona clavipes	O, P	9	Peripheral	Core	146, 159, 161
Tetragonisca angustula	P	10	Connectors	Core	2, 6, 25, 27, 38, 85, 94, 103, 117, 153
Trigona branneri	O, P	8	Peripheral	Core	31, 159
Trigona spinipes	FT, O, P	39	Connectors	Core	4, 9, 15, 19, 25, 26, 31, 38, 56, 57, 59, 64, 71, 74, 76, 79, 84, 87, 88, 89, 93, 94, 99, 103, 118, 129, 133, 138, 146, 161
XYLOCOPINI					
Xylocopa frontalis	P	5	Connectors	Periphery	19, 35, 129, 143, 147
WASP					
Polybia ignobilis	NA	8	Peripheral	Core	26, 92, 159

Table 2: Oil-producing flowers with functional roles in the modular structure and core-periphery organization. (Floral resources: nectar = N; oil = O; pollen = P)

Species	Floral Resources	Floral type	Degree	Species role in modularity	Core-periphery group	Reference ID (see appendix 2)
GESNERIACEAE						
Drymonia serrulata	N, O, P	Gullet	19	Module hub	Core	42
KRAMERIACEAE						
Krameria grandiflora	O, P	Dish	14	Connectors	Core	10, 36
Krameria tomentosa	O, P	Dish	18	Connectors	Core	9, 36, 52
MALPIGHIACEAE						
Alicia anisopetala	O, P	Dish	11	Peripheral	Core	40, 51, 160
Banisteriopsis adenopoda	O, P	Dish	16	Peripheral	Core	40, 70, 138, 141, 145
Banisteriopsis campestris	O, P	Dish	23	Module hub	Core	8, 57, 58, 61, 74
Banisteriopsis laevifolia	O, P	Dish	17	Peripheral	Core	61, 74, 146
Banisteriopsis malifolia	O, P	Dish	40	Module hub	Core	57, 58, 61, 64, 104, 107, 108, 113, 141, 145
Banisteriopsis muricata	O, P	Dish	22	Peripheral	Core	5, 39, 40, 51, 52, 53, 59
Banisteriopsis oxyclada	O, P	Dish	12	Peripheral	Core	97, 141, 145
Banisteriopsis schizoptera	O, P	Dish	14	Peripheral	Core	5, 59, 61
Banisteriopsis stellaris	O, P	Dish	11	Peripheral	Core	5, 59, 61, 106, 138, 141
Banisteriopsis variabilis	O, P	Dish	13	Peripheral	Core	61, 64
Byrsonima crassa	O, P	Dish	27	Peripheral	Core	140, 159
Byrsonima cydoniifolia	O, P	Dish	26	Peripheral	Core	38, 47, 87, 135, 162
Byrsonima gardneriana	O, P	Dish	14	Peripheral	Core	4, 5, 15, 151
Byrsonima intermedia	O, P	Dish	57	Module hub	Core	13, 25, 31, 56, 63, 71, 74, 91, 92, 97, 113, 136, 138, 141, 145, 161
Byrsonima amoena	O, P	Dish	3	Module hub	Periphery	91, 137
Byrsonima basiloba	O, P	Dish	9	Module hub	Periphery	8, 13, 61
Byrsonima coccolobifolia	O, P	Dish	39	Module hub	Core	2, 3, 8, 61, 92, 97, 138, 153, 159

Byrsonima crassifolia	O, P	Dish	43	Peripheral	Core	62, 73, 85, 91, 117, 127, 131, 160
Byrsonima guilleminiana	O, P	Dish	15	Module hub	Core	159
Byrsonima laxiflora	O, P	Dish	35	Module hub	Core	61, 159
Byrsonima pachyphylla	O, P	Dish	13	Connectors	Core	25, 61
Byrsonima psilandra	O, P	Dish	4	Connectors	Periphery	21, 56
Byrsonima rotunda	O, P	Dish	15	Peripheral	Core	27, 62
Byrsonima sericea	O, P	Dish	64	Module hub	Core	15, 17, 47, 48, 54, 78, 84, 86, 87, 91, 94, 136, 142, 144, 148, 150
Byrsonima spicata	O, P	Dish	17	Peripheral	Core	35, 62
Byrsonima subterranea	O, P	Dish	22	Module hub	Core	61, 159
Byrsonima umbellata	O, P	Dish	50	Network hub	Core	27, 159
Byrsonima variabilis	O, P	Dish	15	Peripheral	Core	83, 93, 140
Byrsonima verbascifolia	O, P	Dish	35	Module hub	Core	61, 97, 153, 159
Dicella bracteosa	O, P	Dish	15	Peripheral	Core	5, 40
Diplopterys pubipetala	O, P	Dish	26	Connectors	Core	5, 34, 40, 52, 59, 61, 74, 97, 136, 141, 161
Heteropterys alternifolia	O, P	Dish	10	Peripheral	Core	15
Heteropterys byrsonimifolia	O, P	Dish	17	Peripheral	Core	44, 89, 92, 97, 104, 108, 136, 141
Malpighia emarginata	O, P	Dish	41	Module hub	Core	19, 43, 44, 65, 68, 75, 86, 88, 89, 98, 99, 102, 103, 104, 108, 118, 150, 152
Malpighia glabra	O, P	Dish	116	Connectors	Periphery	102, 147
Mascagnia cordifolia	O, P	Dish	10	Peripheral	Core	40, 51, 97, 141
Niedenzuella acutifolia	O, P	Dish	12	Peripheral	Core	40, 51, 114
Peixotoa reticulata	O, P	Dish	23	Peripheral	Core	61, 138, 141, 145, 161
Peixotoa tomentosa	O, P	Dish	14	Peripheral	Core	57, 97
Stigmaphyllon bonariense	O, P	Dish	13	Peripheral	Core	129
Stigmaphyllon lalandianum	O, P	Dish	19	Peripheral	Core	40, 141, 145
Stigmaphyllon paralias	O, P	Dish	10	Peripheral	Core	5, 15, 48, 139
Tetrapterys phlomoides	O, P	Dish	9	Peripheral	Core	40, 51

ORCHIDACEAE						
Trichocentrum stipitatum	O, P	Flag	4	Connectors	Periphery	117
PLANTAGINACEAE						
Angelonia campestris	O, P	Gullet	4	Connectors	Periphery	133
Angelonia eriostachys	O, P	Gullet	4	Connectors	Periphery	26
Angelonia integerrima	O, P	Gullet	21	Peripheral	Core	21, 26, 36, 56, 76
Mecardonia procumbens	N, O, P	Gullet	15	Peripheral	Core	80

Appendix list

Appendix 1: Revised literature.

Appendix 2: Reference metadata.

Appendix 2: Plant metadata (World biomes: DXS = Deserts and Xeric Shrublands; FGS = Flooded Grasslands and Savannas; MAN = Mangroves; MF = Mediterranean Forests, Woodlands, and Scrub; MGS = Montane Grasslands and Shrublands; TBMF = Temperate Broadleaf and Mixed Forests; TCF = Temperate Coniferous Forests; TEG = Temperate Grasslands; TDF = Tropical and Subtropical Dry Broadleaf Forests; TRG = Tropical Grasslands; TMF = Tropical and Subtropical Moist Broadleaf Forests).

Appendix 2: Animal metadata (World biomes: DXS = Deserts and Xeric Shrublands; FGS = Flooded Grasslands and Savannas; MAN = Mangroves; MF = Mediterranean Forests, Woodlands, and Scrub; MGS = Montane Grasslands and Shrublands; TBMF = Temperate Broadleaf and Mixed Forests; TCF = Temperate Coniferous Forests; TEG = Temperate Grasslands; TDF = Tropical and Subtropical Dry Broadleaf Forests; TRG = Tropical Grasslands; TMF = Tropical and Subtropical Moist Broadleaf Forests).

Appendix 2: Interaction matrix between oil-producing flowers and floral visitors.

Appendix 1: Revised literature.

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Appendix 2: Reference metadata.

Reference ID	Reference Paper	Publication language	Publication type	Latitude	Hemisphere	Longitude	Hemisphere	Country	Ecosystem type	Sampling method
1	Aguiar & Melo, 2009	English	Scientific journals	21°41'56"	S	57°52'58"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Zoocentric
1	Aguiar & Melo, 2009	English	Scientific journals	05°30'14"	S	41°19'22"	W	Brazil	Deserts and Xeric Shrublands	Zoocentric
2	Amorim & Marco, 2011	English	Scientific journals	16°54'43"	S	49°27'03"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Phytocentric
3	Benezar & Pessoni, 2006	Portuguese	Scientific journals	02°51'50"	N	60°42'54"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Phytocentric
4	Bezerra *et al.*, 2009a	Portuguese	Scientific journals	08°34'61"	S	37°13'63"	W	Brazil	Deserts and Xeric Shrublands	Phytocentric
4	Bezerra *et al.*, 2009a	Portuguese	Scientific journals	08°34'61"	S	37°15'08"	W	Brazil	Deserts and Xeric Shrublands	Phytocentric
4	Bezerra *et al.*, 2009a	Portuguese	Scientific journals	08°34'61"	S	08°15'12"	W	Brazil	Deserts and Xeric Shrublands	Phytocentric
4	Bezerra *et al.*, 2009a	Portuguese	Scientific journals	07°33'00"	S	35°00'00"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
5	Bezerra *et al.*, 2009b	English	Scientific journals	08°24'00"	S	37°09'30"	W	Brazil	Deserts and Xeric Shrublands	Phytocentric
6	Buchmann & Buchmann, 1981	English	Scientific journals	09°10'00"	N	79°51'00"	W	Panama	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric

7	Cane *et al.*, 1983	English	Scientific journals	42°28'46"	N	74°10'19"	W	United States	Temperate Broadleaf and Mixed Forests	Zoocentric
8	Cappellari *et al*., 2012	English	Scientific journals	24°32'00"	S	50°16'00"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Zoocentric
8	Cappellari *et al*., 2012	English	Scientific journals	19°16'00"	S	46°56'00"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Zoocentric
8	Cappellari *et al*., 2012	English	Scientific journals	15°56'00"	S	47°52'00"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Zoocentric
9	Carneiro *et al*., 2015	English	Scientific journals	06°44'25"	S	35°08'36"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
10	Carneiro *et al*., 2019	English	Scientific journals	04°05'00"	S	41°44'00"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
10	Carneiro *et al*., 2019	English	Scientific journals	06°34'00"	S	37°15'00"	W	Brazil	Deserts and Xeric Shrublands	Phytocentric
10	Carneiro *et al*., 2019	English	Scientific journals	13°27'00"	S	47°05'00"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Phytocentric
10	Carneiro *et al*., 2019	English	Scientific journals	11°01'00"	S	42°43'00"	W	Brazil	Deserts and Xeric Shrublands	Phytocentric
10	Carneiro *et al*., 2019	English	Scientific journals	14°16'00"	S	43°49'00"	W	Brazil	Tropical and Subtropical Dry Broadleaf Forests	Phytocentric
10	Carneiro *et al*., 2019	English	Scientific journals	19°14'00"	S	57°38'00"	W	Brazil	Flooded Grasslands and Savannas	Phytocentric

11	Cacucci, 1991	English	Scientific journals	25°27'59"	S	65°34'00"	W	Argentina	Tropical and Subtropical Dry Broadleaf Forests	Phytocentric
11	Cacucci, 1991	English	Scientific journals	26°35'38"	S	65°16'44"	W	Argentina	Tropical and Subtropical Dry Broadleaf Forests	Phytocentric
11	Cacucci, 1991	English	Scientific journals	26°51'06"	S	65°42'35"	W	Argentina	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
11	Cacucci, 1991	English	Scientific journals	28°18'38"	S	65°21'49"	W	Argentina	Tropical and Subtropical Dry Broadleaf Forests	Phytocentric
11	Cacucci, 1991	English	Scientific journals	28°28'10"	S	65°46'46"	W	Argentina	Tropical and Subtropical Dry Broadleaf Forests	Phytocentric
11	Cacucci, 1991	English	Scientific journals	31°17'54"	S	64°39'00"	W	Argentina	Tropical and Subtropical Dry Broadleaf Forests	Phytocentric
11	Cacucci, 1991	English	Scientific journals	31°19'54"	S	63°37'19"	W	Argentina	Temperate Grasslands, Savannas, and Shrublands	Phytocentric
11	Cacucci, 1991	English	Scientific journals	31°21'41"	S	64°34'58"	W	Argentina	Tropical and Subtropical Dry Broadleaf Forests	Phytocentric
11	Cacucci, 1991	English	Scientific journals	31°23'04"	S	62°49'42"	W	Argentina	Temperate Grasslands, Savannas, and Shrublands	Phytocentric
11	Cacucci, 1991	English	Scientific journals	31°25'05"	S	64°10'04"	W	Argentina	Temperate Grasslands, Savannas, and Shrublands	Phytocentric
11	Cacucci, 1991	English	Scientific journals	31°33'22"	S	63°32'08"	W	Argentina	Temperate Grasslands, Savannas, and Shrublands	Phytocentric
11	Cacucci, 1991	English	Scientific journals	31°34'33"	S	64°39'40"	W	Argentina	Tropical and Subtropical Dry Broadleaf Forests	Phytocentric

11	Cacucci, 1991	English	Scientific journals	31°36'24"	S	62°25'41"	W	Argentina	Tropical and Subtropical Dry Broadleaf Forests	Phytocentric
11	Cacucci, 1991	English	Scientific journals	31°36'33"	S	64°45'30"	W	Argentina	Tropical and Subtropical Dry Broadleaf Forests	Phytocentric
11	Cacucci, 1991	English	Scientific journals	31°39'10"	S	64°25'04"	W	Argentina	Tropical and Subtropical Dry Broadleaf Forests	Phytocentric
11	Cacucci, 1991	English	Scientific journals	32°13'25"	S	64°38'23"	W	Argentina	Tropical and Subtropical Dry Broadleaf Forests	Phytocentric
12	Cacucci & Vogel, 2001	English	Scientific journals	28°01'33"	S	67°21'01"	W	Argentina	Montane Grasslands and Shrublands	Phytocentric
12	Cacucci & Vogel, 2001	English	Scientific journals	28°28'56"	S	64°34'07"	W	Argentina	Tropical and Subtropical Dry Broadleaf Forests	Phytocentric
12	Cacucci & Vogel, 2001	English	Scientific journals	31°19'57"	S	64°39'00"	W	Argentina	Tropical and Subtropical Dry Broadleaf Forests	Phytocentric
12	Cacucci & Vogel, 2001	English	Scientific journals	31°23'24"	S	64°29'40"	W	Argentina	Tropical and Subtropical Dry Broadleaf Forests	Phytocentric
12	Cacucci & Vogel, 2001	English	Scientific journals	31°23'32"	S	64°35'48"	W	Argentina	Tropical and Subtropical Dry Broadleaf Forests	Phytocentric
12	Cacucci & Vogel, 2001	English	Scientific journals	31°28'55"	S	64°34'09"	W	Argentina	Tropical and Subtropical Dry Broadleaf Forests	Phytocentric
12	Cacucci & Vogel, 2001	English	Scientific journals	31°34'30"	S	64°39'41"	W	Argentina	Tropical and Subtropical Dry Broadleaf Forests	Phytocentric
12	Cacucci & Vogel, 2001	English	Scientific journals	41°58'58"	S	71°26'59"	W	Argentina	Temperate Broadleaf and Mixed Forests	Phytocentric
12	Cacucci & Vogel, 2001	English	Scientific journals	25°25'47"	S	49°16'19"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric

12	Cacucci & Vogel, 2001	English	Scientific journals	30°30'43"	S	53°29'27"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Phytocentric
13	Balestra *et al.*, 2014	English	Scientific journals	17°47'05"	S	50°58'00"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
14	Cosacov *et al.*, 2014	English	Scientific journals	35°10'00"	S	70°14'00"	W	Argentina	Montane Grasslands and Shrublands	Phytocentric
14	Cosacov *et al.*, 2014	English	Scientific journals	36°84'00"	S	71°01'00"	W	Argentina	Temperate Broadleaf and Mixed Forests	Phytocentric
14	Cosacov *et al.*, 2014	English	Scientific journals	37°82'00"	S	70°96'00"	W	Argentina	Temperate Broadleaf and Mixed Forests	Phytocentric
14	Cosacov *et al.*, 2014	English	Scientific journals	39°99'00"	S	70°04'00"	W	Argentina	Temperate Grasslands, Savannas, and Shrublands	Phytocentric
14	Cosacov *et al.*, 2014	English	Scientific journals	40°07'00"	S	71°34'00"	W	Argentina	Temperate Broadleaf and Mixed Forests	Phytocentric
14	Cosacov *et al.*, 2014	English	Scientific journals	41°97'00"	S	71°48'00"	W	Argentina	Temperate Broadleaf and Mixed Forests	Phytocentric
14	Cosacov *et al.*, 2014	English	Scientific journals	42°46'00"	S	71°61'00"	W	Argentina	Temperate Broadleaf and Mixed Forests	Phytocentric
14	Cosacov *et al.*, 2014	English	Scientific journals	45°47'00"	S	69°52'00"	W	Argentina	Temperate Grasslands, Savannas, and Shrublands	Phytocentric
14	Cosacov *et al.*, 2014	English	Scientific journals	45°51'00"	S	67°62'00"	W	Argentina	Temperate Grasslands, Savannas, and Shrublands	Phytocentric

14	Cosacov *et al.*, 2014	English	Scientific journals	45°82'00"	S	67°97'00"	W	Argentina	Temperate Grasslands, Savannas, and Shrublands	Phytocentric
14	Cosacov *et al.*, 2014	English	Scientific journals	46°47'00"	S	69°51'00"	W	Argentina	Temperate Grasslands, Savannas, and Shrublands	Phytocentric
14	Cosacov *et al.*, 2014	English	Scientific journals	46°61'00"	S	71°64'00"	W	Argentina	Temperate Broadleaf and Mixed Forests	Phytocentric
14	Cosacov *et al.*, 2014	English	Scientific journals	46°61'00"	S	69°60'00"	W	Argentina	Temperate Grasslands, Savannas, and Shrublands	Phytocentric
14	Cosacov *et al.*, 2014	English	Scientific journals	46°75'00"	S	67°38'00"	W	Argentina	Temperate Grasslands, Savannas, and Shrublands	Phytocentric
14	Cosacov *et al.*, 2014	English	Scientific journals	46°98'00"	S	70°69'00"	W	Argentina	Temperate Grasslands, Savannas, and Shrublands	Phytocentric
14	Cosacov *et al.*, 2014	English	Scientific journals	47°75'00"	S	65°92'00"	W	Argentina	Temperate Grasslands, Savannas, and Shrublands	Phytocentric
14	Cosacov *et al.*, 2014	English	Scientific journals	48°29'00"	S	71°05'00"	W	Argentina	Temperate Grasslands, Savannas, and Shrublands	Phytocentric
14	Cosacov *et al.*, 2014	English	Scientific journals	48°72'00"	S	69°72'00"	W	Argentina	Temperate Grasslands, Savannas, and Shrublands	Phytocentric
14	Cosacov *et al.*, 2014	English	Scientific journals	48°74'00"	S	70°40'00"	W	Argentina	Temperate Grasslands, Savannas, and Shrublands	Phytocentric

14	Cosacov *et al.*, 2014	English	Scientific journals	49°32'00"	S	67°77'00"	W	Argentina	Temperate Grasslands, Savannas, and Shrublands	Phytocentric
14	Cosacov *et al.*, 2014	English	Scientific journals	49°40'00"	S	71°51'00"	W	Argentina	Temperate Grasslands, Savannas, and Shrublands	Phytocentric
14	Cosacov *et al.*, 2014	English	Scientific journals	49°64'00"	S	69°43'00"	W	Argentina	Temperate Grasslands, Savannas, and Shrublands	Phytocentric
14	Cosacov *et al.*, 2014	English	Scientific journals	49°66'00"	S	72°86'00"	W	Argentina	Temperate Broadleaf and Mixed Forests	Phytocentric
14	Cosacov *et al.*, 2014	English	Scientific journals	50°23'00"	S	68°92'00"	W	Argentina	Temperate Grasslands, Savannas, and Shrublands	Phytocentric
14	Cosacov *et al.*, 2014	English	Scientific journals	50°49'00"	S	72°65'00"	W	Argentina	Temperate Broadleaf and Mixed Forests	Phytocentric
14	Cosacov *et al.*, 2014	English	Scientific journals	50°95'00"	S	69°25'00"	W	Argentina	Temperate Grasslands, Savannas, and Shrublands	Phytocentric
14	Cosacov *et al.*, 2014	English	Scientific journals	51°38'00"	S	72°24'00"	W	Argentina	Temperate Grasslands, Savannas, and Shrublands	Phytocentric
14	Cosacov *et al.*, 2014	English	Scientific journals	51°62'00"	S	69°63'00"	W	Argentina	Temperate Grasslands, Savannas, and Shrublands	Phytocentric
14	Cosacov *et al.*, 2014	English	Scientific journals	45°33'00"	S	71°81'00"	W	Chile	Temperate Broadleaf and Mixed Forests	Phytocentric
15	Costa *et al.*, 2006	Portuguese	Scientific journals	12°56'59"	S	38°20'25"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric

16	Devoto & Medan, 2008	English	Scientific journals	36°30'00"	S	58°30'00"	W	Argentina	Temperate Grasslands, Savannas, and Shrublands	Phytocentric
17	Dunley *et al.*, 2009	English	Scientific journals	22°56'44"	S	42°06'37"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
17	Dunley *et al.*, 2009	English	Scientific journals	22°55'47"	S	42°02'31"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
18	Ferreiro *et al.*, 2015	English	Scientific journals	41°65'00"	S	65°33'00"	W	Argentina	Temperate Grasslands, Savannas, and Shrublands	Phytocentric
18	Ferreiro *et al.*, 2015	English	Scientific journals	40°64"00"	S	66°25'00"	W	Argentina	Temperate Grasslands, Savannas, and Shrublands	Phytocentric
18	Ferreiro *et al.*, 2015	English	Scientific journals	40°02'00"	S	64°44'00"	W	Argentina	Temperate Grasslands, Savannas, and Shrublands	Phytocentric
18	Ferreiro *et al.*, 2015	English	Scientific journals	39°04'00"	S	68°71'00"	W	Argentina	Temperate Grasslands, Savannas, and Shrublands	Phytocentric
18	Ferreiro *et al.*, 2015	English	Scientific journals	38°08'00"	S	65°69'00"	W	Argentina	Temperate Grasslands, Savannas, and Shrublands	Phytocentric
18	Ferreiro *et al.*, 2015	English	Scientific journals	37°50'00"	S	67°71'00"	W	Argentina	Temperate Grasslands, Savannas, and Shrublands	Phytocentric
18	Ferreiro *et al.*, 2015	English	Scientific journals	35°24'00"	S	67°67'00"	W	Argentina	Temperate Grasslands, Savannas, and Shrublands	Phytocentric

18	Ferreiro *et al.*, 2015	English	Scientific journals	32°93'00"	S	69°23'00"	W	Argentina	Montane Grasslands and Shrublands	Phytocentric
18	Ferreiro *et al.*, 2015	English	Scientific journals	31°78'00"	S	65°19'00"	W	Argentina	Tropical and Subtropical Dry Broadleaf Forests	Phytocentric
18	Ferreiro *et al.*, 2015	English	Scientific journals	31°77'00"	S	68°79'00"	W	Argentina	Montane Grasslands and Shrublands	Phytocentric
18	Ferreiro *et al.*, 2015	English	Scientific journals	30°74'00"	S	68°96'00"	W	Argentina	Montane Grasslands and Shrublands	Phytocentric
18	Ferreiro *et al.*, 2015	English	Scientific journals	30°21'00"	S	67°56'00"	W	Argentina	Montane Grasslands and Shrublands	Phytocentric
18	Ferreiro *et al.*, 2015	English	Scientific journals	29°43'00"	S	67°86'00"	W	Argentina	Montane Grasslands and Shrublands	Phytocentric
18	Ferreiro *et al.*, 2015	English	Scientific journals	29°35'00"	S	67°78'00"	W	Argentina	Montane Grasslands and Shrublands	Phytocentric
18	Ferreiro *et al.*, 2015	English	Scientific journals	26°97'00"	S	66°74'00"	W	Argentina	Montane Grasslands and Shrublands	Phytocentric
18	Ferreiro *et al.*, 2015	English	Scientific journals	26°61'00"	S	65°84'00"	W	Argentina	Montane Grasslands and Shrublands	Phytocentric
19	Freitas *et al.*, 1999	English	Scientific journals	03°43'00"	S	38°32'00"	W	Brazil	Deserts and Xeric Shrublands	Phytocentric
20	Gimenes & Lobão, 2006	Portuguese	Scientific journals	12°43'42"	S	38°08'00"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
21	Gonçalves & Melo, 2005	Portuguese	Scientific journals	25°13'47"	S	49°59'26"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Zoocentric

22	Hollens *et al.*, 2016	English	Scientific journals	31°36'00"	S	19°14'00"	E	South African	Deserts and Xeric Shrublands	Phytocentric
23	Machado *et al.*, 2002	English	Scientific journals	08°33'00"	S	37°14'00"	W	Brazil	Deserts and Xeric Shrublands	Phytocentric
24	Manning & Goldblatt, 2002	English	Scientific journals	34°19'07"	S	18°59'07"	E	South African	Mediterranean Forests, Woodlands, and Scrub	Phytocentric
25	Boas *et al.*, 2013	English	Scientific journals	20°27'00"	S	54°37'00"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Phytocentric
26	Martins *et al.*, 2013	English	Scientific journals	05°30'00"	S	41°19'00"	W	Brazil	Deserts and Xeric Shrublands	Phytocentric
26	Martins *et al.*, 2013	English	Scientific journals	18°12'00"	S	43°19'00"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Phytocentric
26	Martins *et al.*, 2013	English	Scientific journals	30°07'00"	S	51°14'00"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Phytocentric
26	Martins *et al.*, 2013	English	Scientific journals	21°37'00"	S	57°49'00"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Phytocentric
26	Martins *et al.*, 2013	English	Scientific journals	13°34'00"	S	47°11'00"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Phytocentric
27	Mendes *et al.*, 2011	Portuguese	Scientific journals	03°17'30"	S	43°08'42"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric

28	Mickiliunas *et al.*, 2006	Portuguese	Scientific journals	23°15'00"	S	46°52'00"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
29	Murúa & Espindola, 2014	English	Scientific journals	33°19'00"	S	70°16'00"	W	Chile	Montane Grasslands and Shrublands	Phytocentric
29	Murúa & Espindola, 2014	English	Scientific journals	33°23'00"	S	70°27'00"	W	Chile	Temperate Broadleaf and Mixed Forests	Phytocentric
29	Murúa & Espindola, 2014	English	Scientific journals	35°02'00"	S	70°36'00"	W	Chile	Temperate Broadleaf and Mixed Forests	Phytocentric
29	Murúa & Espindola, 2014	English	Scientific journals	35°35'00"	S	70°00'00"	W	Chile	Montane Grasslands and Shrublands	Phytocentric
29	Murúa & Espindola, 2014	English	Scientific journals	36°36'00"	S	72°00'00"	W	Chile	Mediterranean Forests, Woodlands, and Scrub	Phytocentric
29	Murúa & Espindola, 2014	English	Scientific journals	37°23'00"	S	72°57'00"	W	Chile	Temperate Broadleaf and Mixed Forests	Phytocentric
29	Murúa & Espindola, 2014	English	Scientific journals	37°46'00"	S	72°46'00"	W	Chile	Montane Grasslands and Shrublands	Phytocentric
29	Murúa & Espindola, 2014	English	Scientific journals	38°28'00"	S	71°38'00"	W	Chile	Temperate Broadleaf and Mixed Forests	Phytocentric
29	Murúa & Espindola, 2014	English	Scientific journals	50°52'00"	S	72°44'00"	W	Chile	Temperate Broadleaf and Mixed Forests	Phytocentric
30	Nattero *et al.*, 2010	English	Scientific journals	30°52'31"	S	64°32'12"	W	Argentina	Tropical and Subtropical Dry Broadleaf Forests	Phytocentric
30	Nattero *et al.*, 2010	English	Scientific journals	30°49'56"	S	64°29'30"	W	Argentina	Tropical and Subtropical Dry Broadleaf Forests	Phytocentric
30	Nattero *et al.*, 2010	English	Scientific journals	31°36'44"	S	64°48'44"	W	Argentina	Tropical and Subtropical Dry Broadleaf Forests	Phytocentric

30	Nattero *et al.*, 2010	English	Scientific journals	31°00'54"	S	64°17'07"	W	Argentina	Tropical and Subtropical Dry Broadleaf Forests	Phytocentric
31	Oliveira *et al.*, 2007	Portuguese	Scientific journals	20°27'00"	S	20°37'00"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Phytocentric
32	Pansarin & Pansarin, 2011	English	Scientific journals	21°24'00"	S	48°30'00"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Phytocentric
33	Pauw, 2006	English	Scientific journals	34°21'26"	S	18°29'51"	E	South African	Mediterranean Forests, Woodlands, and Scrub	Phytocentric
34	Possobom *et al.*, 2015	English	Scientific journals	22°42'38"	S	48°18'35"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Phytocentric
35	Ribeiro *et al.*, 2008	Portuguese	Scientific journals	02°43'22"	S	42°49'50"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
36	Sabino *et al.*, 2019	English	Scientific journals	05°36'00"	S	35°14'00"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Zoocentric
36	Sabino *et al.*, 2019	English	Scientific journals	13°37'35"	S	47°29'08"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Zoocentric
36	Sabino *et al.*, 2019	English	Scientific journals	25°13'00"	S	49°59'00"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Zoocentric
37	Santos *et al.*, 2019	Portuguese	Scientific journals	08°07'30"	S	34°52'30"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric

38	Sazan *et al.*, 2014	English	Scientific journals	19°34'00"	S	57°02'00"	W	Brazil	Flooded Grasslands and Savannas	Phytocentric
39	Sazima & Sazima, 1989	English	Scientific journals	22°49'00"	S	47°06'00"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
40	Sigrist & Sazima, 2004	English	Scientific journals	22°49'00"	S	47°07'00"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
41	Simpson *et al.*, 1990	English	Scientific journals	27°39'00"	S	66°22'36"	W	Argentina	Montane Grasslands and Shrublands	Phytocentric
42	Steiner, 1985b	English	Scientific journals	09°09'08"	N	79°50'47"	W	Panama	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
42	Steiner, 1985b	English	Scientific journals	09°06'59"	N	79°41'47"	W	Panama	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
42	Steiner, 1985b	English	Scientific journals	09°10'33"	N	79°47'55"	W	Panama	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
42	Steiner, 1985b	English	Scientific journals	09°07'42"	N	79°42'55"	W	Panama	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
43	Aleixo *et al.*, 2013	English	Scientific journals	21°10'30"	S	47°48'38"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Zoocentric
44	Neves *et al.*, 2014	English	Scientific journals	12°40'19"	S	39°06'22"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Zoocentric
45	Gonçalves *et al.*, 2012	English	Scientific journals	25°21'06"	S	51°28'08"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Zoocentric
46	Aguiar, 2003	English	Scientific journals	12°42'00"	S	39°46'00"	W	Brazil	Deserts and Xeric Shrublands	Phytocentric

47	Aguiar, 2017	English	Scientific journals	12°25'00"	S	41°29'00"	W	Brazil	Deserts and Xeric Shrublands	Phytocentric
48	Aguiar *et al.*, 2017	English	Scientific journals	12°25'00"	S	41°29'00"	W	Brazil	Deserts and Xeric Shrublands	Phytocentric
49	Boff *et al.*, 2014	English	Scientific journals	24°22'00"	S	47°58'00"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
50	Cosacov *et al.*, 2014	English	Scientific journals	31°40'57"	S	64°50'13"	W	Argentina	Tropical and Subtropical Dry Broadleaf Forests	Phytocentric
51	Rocha-Filho *et al.*, 2018	English	Scientific journals	22°20'00"	S	49°40'00"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Zoocentric
52	Dórea e*t al.*, 2010a	English	Scientific journals	09°56'40"	S	39°00'55"	W	Brazil	Deserts and Xeric Shrublands	Zoocentric
53	Dórea *et al.*, 2010b	English	Scientific journals	09°56'40"	S	39°00'55"	W	Brazil	Deserts and Xeric Shrublands	Zoocentric
54	Dórea *et al.*, 2017	English	Scientific journals	07°09'11"	S	34°50'28"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Zoocentric
55	Kuhlmann, 2014	English	Scientific journals	31°21'00"	S	19°08'00"	E	South African	Deserts and Xeric Shrublands	Zoocentric
56	Amaral Neto, 2015	English	Dissertations and theses	25°14'13"	S	49°59'58"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Phytocentric
57	Barônio & Torezan-Silingardi, 2017	English	Scientific journals	18°58'56"	S	48°17'45"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Phytocentric

58	Barônio, 2017	English	Dissertations and theses	18°59'00"	S	48°18'00"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Phytocentric
59	Bezerra, 2008	Portuguese	Dissertations and theses	08°32'14"	S	37°14'42"	W	Brazil	Deserts and Xeric Shrublands	Phytocentric
60	Campos, 2014	Portuguese	Dissertations and theses	19°05'48"	S	48°21'05"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Zoocentric
61	Cappellari, 2011	English	Dissertations and theses	15°56'00"	S	47°52'00"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Zoocentric
62	Carvalho *et al*., 2016	English	Scientific journals	06°37'56"	S	45°53'47"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Zoocentric
63	Faria, 2014	Portuguese	Dissertations and theses	25°01'00"	S	47°55'00"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Zoocentric
63	Faria, 2014	Portuguese	Dissertations and theses	23°48'00"	S	46°02'00"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Zoocentric
64	Ferreira, 2013	Portuguese	Dissertations and theses	18°59'00"	S	48°18'00"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Phytocentric
65	Carneiro Neto *et al*., 2017	Portuguese	Congress proceedings	09°19'54"	S	40°37'36"	W	Brazil	Deserts and Xeric Shrublands	Zoocentric
65	Carneiro Neto *et al*., 2017	Portuguese	Congress proceedings	09°19'54"	S	40°25'05"	W	Brazil	Deserts and Xeric Shrublands	Zoocentric

66	Franklin, 2001	English	Dissertations and theses	34°54'51"	N	77°03'23"	W	United States	Temperate Coniferous Forests	Phytocentric
67	Gómiz *et al*., 2014	Spanish	Scientific journals	26°34'18"	S	54°44'42"	W	Argentina	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
68	Guedes *et al.,* 2011	Portuguese	Scientific journals	07°01'00"	S	07°17'00"	W	Brazil	Deserts and Xeric Shrublands	Phytocentric
69	Murúa *et al*., 2014	English	Scientific journals	35°36'00"	S	71°00'00"	W	Chile	Temperate Broadleaf and Mixed Forests	Phytocentric
70	Ibarra, 2013	English	Dissertations and theses	33°19'00"	S	70°16'00"	W	Chile	Montane Grasslands and Shrublands	Phytocentric
70	Ibarra, 2013	English	Dissertations and theses	33°23'00"	S	70°27'00"	W	Chile	Temperate Broadleaf and Mixed Forests	Phytocentric
70	Ibarra, 2013	English	Dissertations and theses	35°02'00"	S	70°16'00"	W	Chile	Montane Grasslands and Shrublands	Phytocentric
70	Ibarra, 2013	English	Dissertations and theses	37°46'00"	S	72°47'00"	W	Chile	Temperate Broadleaf and Mixed Forests	Phytocentric
70	Ibarra, 2013	English	Dissertations and theses	37°49'00"	S	72°57'00"	W	Chile	Temperate Broadleaf and Mixed Forests	Phytocentric
70	Ibarra, 2013	English	Dissertations and theses	38°28'00"	S	71°38'00"	W	Chile	Temperate Broadleaf and Mixed Forests	Phytocentric
70	Ibarra, 2013	English	Dissertations and theses	50°52'00"	S	72°44'00"	W	Chile	Temperate Broadleaf and Mixed Forests	Phytocentric
70	Ibarra, 2013	English	Dissertations and theses	35°35'00"	S	70°00'00"	W	Chile	Montane Grasslands and Shrublands	Phytocentric

71	Ibarra-Isassi & Oliveira, 2017	English	Scientific journals	22°14'43"	S	47°53'23"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Phytocentric
72	Novais *et al.,* 2014	English	Scientific journals	12°26'18"	S	40°13'12"	W	Brazil	Deserts and Xeric Shrublands	Zoocentric
73	Pereira & Freitas, 2000	Portuguese	Scientific journals	04°10'47"	S	38°07'50"	W	Brazil	Deserts and Xeric Shrublands	Phytocentric
74	Polatto & Chaud-Netto, 2013	English	Scientific journals	22°15'00"	S	53°48'00	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
75	Santos *et al*., 2013	English	Scientific journals	38°58'00"	S	38°58'00"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Zoocentric
76	Schlindwein, 1998	English	Scientific journals	30°48'00"	S	53°26'00"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Zoocentric
77	Tadey, 2011	English	Scientific journals	39°05'00"	S	68°35'00"	W	Argentina	Temperate Grasslands, Savannas, and Shrublands	Phytocentric
78	Teixeira & Machado, 2000	Portuguese	Scientific journals	08°07'30"	S	34°52'30"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
79	Vieira *et al.*, 2008	Portuguese	Scientific journals	19°06'48"	S	51°44'03"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Zoocentric
80	Cappellari *et al.,* 2009	English	Scientific journals	29°30'05"	S	50°10'00"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
81	Cappellari *et al.*, 2011	English	Scientific journals	15°56'00"	S	47°53'00"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Phytocentric

82	Downing & Liu, 2012	English	Scientific journals	44°27'02"	N	75°41'00"	W	United States	Temperate Broadleaf and Mixed Forests	Phytocentric
83	Freitas & Sazima, 2006	English	Scientific journals	22°43'57"	S	44°37'06"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Phytocentric
84	Jesus & Aguiar, 2013	Portuguese	Congress proceedings	12°41'66"	S	41°48'33"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Phytocentric
85	King, 2012	English	Dissertations and theses	10°53'01"	N	85°46'30"	W	Costa Rica	Tropical and Subtropical Dry Broadleaf Forests	Phytocentric
86	Lima *et al.*, 2017	English	Scientific journals	13°01'00"	S	38°31'00"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Zoocentric
87	Lua, 2013	Portuguese	Dissertations and theses	12°25'59"	S	41°29'24"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Phytocentric
88	Magalhães & Freitas, 2013	English	Scientific journals	03°51'58"	S	41°06'20"	W	Brazil	Deserts and Xeric Shrublands	Phytocentric
89	Machado, 2011	Portuguese	Dissertations and theses	12°40'12"	S	39°06'07"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
90	Werneck *et al.*, 2015	Portuguese	Scientific journals	20°47'56"	S	42°52'07"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Zoocentric
91	Rego *et al.*, 2006	Portuguese	Scientific journals	03°12'28"	S	43°24'12"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Zoocentric
92	Mello *et al.*, 2011	English	Scientific journals	29°30'00"	S	50°10'00"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric

92	Mello *et al.*, 2011	English	Scientific journals	22°15'00"	S	47°00'00"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Phytocentric
92	Mello *et al.*, 2011	English	Scientific journals	12°42'00"	S	39°46'00"	W	Brazil	Deserts and Xeric Shrublands	Phytocentric
92	Mello *et al.*, 2011	English	Scientific journals	21°30'00"	S	47°50'00"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Phytocentric
93	Melo *et al.*, 2018	English	Scientific journals	20°38'00"	S	43°30'34"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
94	Menezes, 2011	Portuguese	Dissertations and theses	22°25'35"	S	42°01'53"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
95	Menezes *et al.*, 2012	English	Scientific journals	22°25'35"	S	42°01'53"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Zoocentric
96	Mendes & Rego, 2007	Portuguese	Scientific journals	03°12'28"	S	43°24'12"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Zoocentric
97	Silva, 2013	Portuguese	Dissertations and theses	21°31'00"	S	47°51'00"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Phytocentric
97	Silva, 2013	Portuguese	Dissertations and theses	21°19'48"	S	47°22'48"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Phytocentric
97	Silva, 2013	Portuguese	Dissertations and theses	21°21'00"	S	47°23'24"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Phytocentric

97	Silva, 2013	Portuguese	Dissertations and theses	21°22'00"	S	47°22'48"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Phytocentric
97	Silva, 2013	Portuguese	Dissertations and theses	22°15'00"	S	48°00'00"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Phytocentric
98	Oliveira *et al.*, 2013	English	Scientific journals	12°16'00"	S	38°58'00"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Zoocentric
99	Oliveira *et al.*, 2015	Portuguese	Scientific journals	21°28'09"	S	51°35'13"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
100	Oliveira *et al.*, 2016	English	Scientific journals	02°58'12"	S	42°79'56"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
101	Oliveira, 2019	Portuguese	Dissertations and theses	19°02'49"	S	48°21'00"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Phytocentric
102	Villanueva-Gutiérrez & Roubik, 2016	English	Scientific journals	19°43'00"	N	87°48'00"	W	Mexico	Tropical and Subtropical Moist Broadleaf Forests	Zoocentric
103	Vilhena & Augusto, 2007	Portuguese	Scientific journals	19°05'48"	S	48°21'05"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Phytocentric
104	Vilhena *et al.*, 2012	English	Scientific journals	19°05'48"	S	48°21'05"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Zoocentric
105	Pauw, 2005	English	Scientific journals	31°22'00"	S	19°06'00"	E	South African	Mediterranean Forests, Woodlands, and Scrub	Phytocentric

106	Rabelo *et al.*, 2012	English	Scientific journals	19°05'48"	S	48°21'05"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Zoocentric
106	Rabelo *et al.*, 2012	English	Scientific journals	19°09'20"	S	48°23'20"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Zoocentric
107	Rabelo *et al.*, 2014	English	Scientific journals	19°09'20"	S	48°23'20"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Zoocentric
108	Rabelo *et al.*, 2014	English	Scientific journals	19°05'48"	S	48°21'05"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Zoocentric
109	Rabelo *et al.*, 2016	English	Scientific journals	19°11'10"	S	48°24'35"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Zoocentric
109	Rabelo *et al.*, 2016	English	Scientific journals	17°47'56"	S	48°40'23"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Zoocentric
110	Rabelo, 2016	English	Dissertations and theses	19°09'20"	S	48°23'20	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Zoocentric
110	Rabelo, 2016	English	Dissertations and theses	17°47'56"	S	48°40'23"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Zoocentric

110	Rabelo, 2016	English	Dissertations and theses	19°05'48"	S	48°21'05"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Zoocentric
111	Rasmussen, 1999	English	Dissertations and theses	06°13'00"	S	77°52'00"	W	Peru	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
111	Rasmussen, 1999	English	Dissertations and theses	06°25'00"	S	77°55'00"	W	Peru	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
111	Rasmussen, 1999	English	Dissertations and theses	06°56'00"	S	78°08'00"	W	Peru	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
111	Rasmussen, 1999	English	Dissertations and theses	07°03'00"	S	78°38'00"	W	Peru	Montane Grasslands and Shrublands	Phytocentric
111	Rasmussen, 1999	English	Dissertations and theses	07°04'00"	S	78°35'00"	W	Peru	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
111	Rasmussen, 1999	English	Dissertations and theses	07°09'00"	S	78°27'00"	W	Peru	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
111	Rasmussen, 1999	English	Dissertations and theses	09°52'00"	S	76°02'00"	W	Peru	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
111	Rasmussen, 1999	English	Dissertations and theses	11°26'00"	S	75°48'00"	W	Peru	Montane Grasslands and Shrublands	Phytocentric
111	Rasmussen, 1999	English	Dissertations and theses	11°27'00"	S	76°37'00"	W	Peru	Deserts and Xeric Shrublands	Phytocentric
111	Rasmussen, 1999	English	Dissertations and theses	11°58'00"	S	75°18'00"	W	Peru	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
111	Rasmussen, 1999	English	Dissertations and theses	12°19'00"	S	75°13'00"	W	Peru	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric

112	Rech & Absy, 2011	English	Scientific journals	26°06'21"	S	49°47'51"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Zoocentric
113	Rocha-Filho *et al.*, 2008	English	Scientific journals	18°55'00"	S	48°17'00"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Phytocentric
114	Rocha-Filho & Melo, 2011	English	Scientific journals	25°29'00"	S	48°59'00"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
115	Rocha-Filho *et al.*, 2017	English	Scientific journals	23°03'20"	S	44°36'29"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Zoocentric
116	Rosa & Ramalho, 2011	English	Scientific journals	12°32'29"	S	37°59'57"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
116	Rosa & Ramalho, 2011	English	Scientific journals	12°47'58"	S	37°12'56"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
116	Rosa & Ramalho, 2011	English	Scientific journals	12°56'38"	S	38°21'32"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
116	Rosa & Ramalho, 2011	English	Scientific journals	12°57'58"	S	38°24'41"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
116	Rosa & Ramalho, 2011	English	Scientific journals	12°59'15"	S	38°26'32"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
116	Rosa & Ramalho, 2011	English	Scientific journals	12°59'22"	S	38°54'03"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
116	Rosa & Ramalho, 2011	English	Scientific journals	12°46'34"	S	38°19'04"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
116	Rosa & Ramalho, 2011	English	Scientific journals	13°00'16"	S	38°30'39"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric

116	Rosa & Ramalho, 2011	English	Scientific journals	13°03'46"	S	38°46'23"	W	Brazil	Mangroves	Phytocentric
116	Rosa & Ramalho, 2011	English	Scientific journals	13°40'38"	S	39°04'29"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
116	Rosa & Ramalho, 2011	English	Scientific journals	13°49'44"	S	39°11'27"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
116	Rosa & Ramalho, 2011	English	Scientific journals	13°51'27"	S	39°11'36"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
117	Silvera, 2002	English	Dissertations and theses	09°09'00"	N	79°37'12"	W	Panama	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
118	Souza *et al.*, 2016	Portuguese	Congress proceedings	22°20'12"	S	53°48'44"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
119	Steiner, 1990	English	Scientific journals	29°44'42"	S	29°11'19"	E	South African	Montane Grasslands and Shrublands	Phytocentric
120	Steiner, 1993	English	Scientific journals	33°50'25"	S	23°53'38"	E	South African	Mediterranean Forests, Woodlands, and Scrub	Phytocentric
121	Steiner, 1998	English	Scientific journals	34°05'28"	S	23°18'23"	E	South African	Mediterranean Forests, Woodlands, and Scrub	Phytocentric
122	Steiner, 2010	English	Scientific journals	29°20'00"	S	29°29'00"	E	South African	Montane Grasslands and Shrublands	Phytocentric
122	Steiner, 2010	English	Scientific journals	28°55'24"	S	29°08'02"	E	South African	Montane Grasslands and Shrublands	Phytocentric
122	Steiner, 2010	English	Scientific journals	28°41'20"	S	28°56'42"	E	South African	Montane Grasslands and Shrublands	Phytocentric
122	Steiner, 2010	English	Scientific journals	28°44'28"	S	28°53'32"	E	South African	Montane Grasslands and Shrublands	Phytocentric

122	Steiner, 2010	English	Scientific journals	29°51'00"	S	29°14'59"	E	South African	Montane Grasslands and Shrublands	Phytocentric
122	Steiner, 2010	English	Scientific journals	28°15'17"	S	29°11'28"	E	South African	Montane Grasslands and Shrublands	Phytocentric
122	Steiner, 2010	English	Scientific journals	29°35'17"	S	29°17'33"	E	South African	Montane Grasslands and Shrublands	Phytocentric
123	Steiner & Whitehead, 1990	English	Scientific journals	27°59'00"	S	31°10'00"	E	South African	Montane Grasslands and Shrublands	Phytocentric
123	Steiner & Whitehead, 1990	English	Scientific journals	28°30'22"	S	28°37'00"	E	South African	Montane Grasslands and Shrublands	Phytocentric
123	Steiner & Whitehead, 1990	English	Scientific journals	28°44'27"	S	28°53'31"	E	South African	Montane Grasslands and Shrublands	Phytocentric
123	Steiner & Whitehead, 1990	English	Scientific journals	28°55'24"	S	29°08'02"	E	South African	Montane Grasslands and Shrublands	Phytocentric
123	Steiner & Whitehead, 1990	English	Scientific journals	29°35'17"	S	29°17'33"	E	South African	Montane Grasslands and Shrublands	Phytocentric
123	Steiner & Whitehead, 1990	English	Scientific journals	29°35'54"	S	29°18'25"	E	South African	Montane Grasslands and Shrublands	Phytocentric
123	Steiner & Whitehead, 1990	English	Scientific journals	29°44'54"	S	29°18'25"	E	South African	Montane Grasslands and Shrublands	Phytocentric
123	Steiner & Whitehead, 1990	English	Scientific journals	29°50'58"	S	29°14'58"	E	South African	Montane Grasslands and Shrublands	Phytocentric
123	Steiner & Whitehead, 1990	English	Scientific journals	30°42'35"	S	27°12'52"	E	South African	Montane Grasslands and Shrublands	Phytocentric
123	Steiner & Whitehead, 1990	English	Scientific journals	30°42'44"	S	27°13'55"	E	South African	Montane Grasslands and Shrublands	Phytocentric

123	Steiner & Whitehead, 1990	English	Scientific journals	30°59'00"	S	27°00'03"	E	South African	Montane Grasslands and Shrublands	Phytocentric
123	Steiner & Whitehead, 1990	English	Scientific journals	31°10'15"	S	27°16'34"	E	South African	Montane Grasslands and Shrublands	Phytocentric
123	Steiner & Whitehead, 1990	English	Scientific journals	31°10'28"	S	27°58'47"	E	South African	Montane Grasslands and Shrublands	Phytocentric
123	Steiner & Whitehead, 1990	English	Scientific journals	32°11'00"	S	25°37'00"	E	South African	Deserts and Xeric Shrublands	Phytocentric
123	Steiner & Whitehead, 1990	English	Scientific journals	32°12'00"	S	18°57'00"	E	South African	Mediterranean Forests, Woodlands, and Scrub	Phytocentric
123	Steiner & Whitehead, 1990	English	Scientific journals	32°20'00"	S	26°50'00"	E	South African	Montane Grasslands and Shrublands	Phytocentric
123	Steiner & Whitehead, 1990	English	Scientific journals	32°21'00"	S	22°35'00"	E	South African	Deserts and Xeric Shrublands	Phytocentric
123	Steiner & Whitehead, 1990	English	Scientific journals	32°29'32"	S	26°40'51"	E	South African	Montane Grasslands and Shrublands	Phytocentric
123	Steiner & Whitehead, 1990	English	Scientific journals	32°35'52"	S	26°56'16"	E	South African	Montane Grasslands and Shrublands	Phytocentric
123	Steiner & Whitehead, 1990	English	Scientific journals	32°40'40"	S	27°15'36"	E	South African	Montane Grasslands and Shrublands	Phytocentric
123	Steiner & Whitehead, 1990	English	Scientific journals	34°12'49"	S	19°10'02"	E	South African	Mediterranean Forests, Woodlands, and Scrub	Phytocentric
124	Steiner & Whitehead, 1991	English	Scientific journals	27°21'35"	S	30°08'14"	E	South African	Montane Grasslands and Shrublands	Phytocentric
124	Steiner & Whitehead, 1991	English	Scientific journals	28°55'24"	S	29°08'02"	E	South African	Montane Grasslands and Shrublands	Phytocentric

124	Steiner & Whitehead, 1991	English	Scientific journals	28°55'31"	S	29°07'57"	E	South African	Montane Grasslands and Shrublands	Phytocentric
124	Steiner & Whitehead, 1991	English	Scientific journals	29°04'45"	S	29°20'35"	E	South African	Montane Grasslands and Shrublands	Phytocentric
124	Steiner & Whitehead, 1991	English	Scientific journals	29°10'45"	S	28°52'59"	E	Lesotho	Montane Grasslands and Shrublands	Phytocentric
124	Steiner & Whitehead, 1991	English	Scientific journals	29°23'59"	S	30°16'42"	E	South African	Montane Grasslands and Shrublands	Phytocentric
124	Steiner & Whitehead, 1991	English	Scientific journals	29°31'60"	S	29°40'60"	E	South African	Montane Grasslands and Shrublands	Phytocentric
124	Steiner & Whitehead, 1991	English	Scientific journals	29°35'10"	S	29°17'20"	E	Lesotho	Montane Grasslands and Shrublands	Phytocentric
124	Steiner & Whitehead, 1991	English	Scientific journals	29°35'17"	S	29°17'33"	E	South African	Montane Grasslands and Shrublands	Phytocentric
124	Steiner & Whitehead, 1991	English	Scientific journals	30°45'52"	S	28°06'19"	E	South African	Montane Grasslands and Shrublands	Phytocentric
124	Steiner & Whitehead, 1991	English	Scientific journals	31°02'00"	S	28°25'00"	E	South African	Montane Grasslands and Shrublands	Phytocentric
124	Steiner & Whitehead, 1991	English	Scientific journals	31°40'00"	S	28°00'00"	E	South African	Montane Grasslands and Shrublands	Phytocentric
124	Steiner & Whitehead, 1991	English	Scientific journals	32°32'00"	S	18°55'00"	E	South African	Mediterranean Forests, Woodlands, and Scrub	Phytocentric
125	Steiner & Whitehead, 1996	English	Scientific journals	32°54'06"	S	19°14'12"	E	South African	Mediterranean Forests, Woodlands, and Scrub	Phytocentric
126	Steiner & Whitehead, 2002	English	Scientific journals	29°53'00"	S	17°52'34"	E	South African	Deserts and Xeric Shrublands	Phytocentric

127	Thiele & Inouye, 2007	English	Scientific journals	10°26'00"	N	84°00'00"	W	Costa Rica	Tropical and Subtropical Moist Broadleaf Forests	Zoocentric
128	Torreta *et al.*, 2011	Spanish	Scientific journals	27°28'00"	S	55°07'00"	W	Argentina	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
129	Torreta *et al.*, 2018	English	Scientific journals	25°40'00"	S	54°27'00"	W	Argentina	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
129	Torreta *et al.*, 2018	English	Scientific journals	27°17'00"	S	55°35'00"	W	Argentina	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
129	Torreta *et al.*, 2018	English	Scientific journals	27°22'00"	S	58°41'00"	W	Argentina	Flooded Grasslands and Savannas	Phytocentric
129	Torreta *et al.*, 2018	English	Scientific journals	27°54'00"	S	55°43'00"	W	Argentina	Flooded Grasslands and Savannas	Phytocentric
129	Torreta *et al.*, 2018	English	Scientific journals	29°28'00"	S	56°49'00"	W	Argentina	Flooded Grasslands and Savannas	Phytocentric
129	Torreta *et al.*, 2018	English	Scientific journals	31°22'00"	S	57°59'00"	W	Argentina	Temperate Grasslands, Savannas, and Shrublands	Phytocentric
129	Torreta *et al.*, 2018	English	Scientific journals	32°12'00"	S	58°12'00"	W	Argentina	Temperate Grasslands, Savannas, and Shrublands	Phytocentric
129	Torreta *et al.*, 2018	English	Scientific journals	33°53'00"	S	58°52'00"	W	Argentina	Flooded Grasslands and Savannas	Phytocentric
129	Torreta *et al.*, 2018	English	Scientific journals	34°06'00"	S	59°00'00"	W	Argentina	Flooded Grasslands and Savannas	Phytocentric
129	Torreta *et al.*, 2018	English	Scientific journals	34°10'00"	S	58°15'00"	W	Argentina	Flooded Grasslands and Savannas	Phytocentric

129	Torreta *et al.*, 2018	English	Scientific journals	34°35'00"	S	58°28'00"	W	Argentina	Temperate Grasslands, Savannas, and Shrublands	Phytocentric
130	Zambão, 2011	Portuguese	Dissertations and theses	22°06'31"	S	55°19'09"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Phytocentric
131	Vinsos *et al.*, 1997	English	Scientific journals	10°27'23"	N	85°20'25"	W	Costa Rica	Tropical and Subtropical Dry Broadleaf Forests	Phytocentric
131	Vinsos *et al.*, 1997	English	Scientific journals	10°20'20"	N	85°50'45"	W	Costa Rica	Tropical and Subtropical Dry Broadleaf Forests	Phytocentric
132	Vogel, 1984	English	Scientific journals	26°47'27"	S	28°30'54"	E	South African	Montane Grasslands and Shrublands	Zoocentric
133	Vogel & Machado, 1991	English	Scientific journals	08°04'00"	S	36°03'00"	W	Brazil	Deserts and Xeric Shrublands	Phytocentric
134	Vogel & Cocucci, 1995	English	Scientific journals	24°36'00"	S	64°46'01"	W	Argentina	Tropical and Subtropical Dry Broadleaf Forests	Phytocentric
135	Souza *et al.*, 2018	English	Scientific journals	19°36'15"	S	19°02'50"	W	Brazil	Flooded Grasslands and Savannas	Phytocentric
136	Aguiar & Gaglianone, 2003	English	Scientific journals	21°33'00"	S	47°45'00"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Zoocentric
136	Aguiar & Gaglianone, 2003	English	Scientific journals	12°27'38"	S	41°31'08"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Zoocentric
136	Aguiar & Gaglianone, 2003	English	Scientific journals	10°19'29"	S	39°13'59"	W	Brazil	Deserts and Xeric Shrublands	Zoocentric

137	Albuquerque & Medonça, 1996	Portuguese	Scientific journals	07°13'16"	S	44°33'22"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Zoocentric
138	Andena *et al.*, 2005	Portuguese	Scientific journals	22°15'00"	S	47°00'00"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Phytocentric
139	Carvalho *et al.*, 2005	Portuguese	Scientific journals	12°11'58"	S	38°57'59"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
140	Faria-Mucci *et al.*, 2003	Portuguese	Scientific journals	20°28'22"	S	43°33'50"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Phytocentric
141	Gaglianone, 2003	Portuguese	Scientific journals	21°33'00"	S	47°45'00"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Phytocentric
142	Gimenes *et al.*, 2007	Portuguese	Scientific journals	12°42'00"	S	38°20'00"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
143	Marchi *et al.*, 2015	English	Scientific journals	22°38'00"	S	47°10'00"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Phytocentric
144	Carpim, 2019	Portuguese	Dissertations and theses	20°36'18"	S	40°25'35"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
145	Gaglianone, 2001	Portuguese	Scientific journals	21°37'03"	S	47°45'55"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Phytocentric

146	Lima, 2005	Portuguese	Dissertations and theses	15°52'00"	S	47°51'00"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Phytocentric
147	Magalhães *et al.*, 1997	English	Scientific journals	01°16'40"	S	48°20'00"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
148	Martins *et al.*, 2019	English	Scientific journals	07°09'11"	S	34°50'28"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Zoocentric
149	Mello, 2019	Portuguese	Dissertations and theses	21°35'44"	S	47°45'24"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Zoocentric
150	Milet-Pinheiro & Schlindwein, 2008	Portuguese	Scientific journals	08°11'19"	S	35°28'13"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
151	Moura, 2003	Portuguese	Dissertations and theses	09°34'15"	S	37°59'12"	W	Brazil	Deserts and Xeric Shrublands	Phytocentric
151	Moura, 2003	Portuguese	Dissertations and theses	09°43'18"	S	37°58'07"	W	Brazil	Deserts and Xeric Shrublands	Phytocentric
152	Oliveira & Schlindwein, 2009	English	Scientific journals	07°41'00"	S	34°67'00"	W	Brazil	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
153	Damasceno, 1998	Portuguese	Dissertations and theses	17°02'00"	S	45°50'00"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Phytocentric
154	Steiner, 1985a	English	Scientific journals	09°09'00"	N	79°51'00"	W	Panama	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
155	Sérsic & Cocucci, 1999	English	Scientific journals	30°40'00"	S	71°40'00"	W	Chile	Mediterranean Forests, Woodlands, and Scrub	Phytocentric

155	Sérsic & Cocucci, 1999	English	Scientific journals	31°20'46"	S	65°04'46"	W	Argentina	Tropical and Subtropical Dry Broadleaf Forests	Phytocentric
155	Sérsic & Cocucci, 1999	English	Scientific journals	32°32'07"	S	67°01'32"	W	Argentina	Montane Grasslands and Shrublands	Phytocentric
155	Sérsic & Cocucci, 1999	English	Scientific journals	32°56'26"	S	69°12'31"	W	Argentina	Tropical and Subtropical Dry Broadleaf Forests	Phytocentric
156	Sérsic, 2004	English	Scientific journals	25°09'14"	S	65°51'57"	W	Argentina	Montane Grasslands and Shrublands	Phytocentric
156	Sérsic, 2004	English	Scientific journals	26°48'50"	S	65°43'30"	W	Argentina	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
156	Sérsic, 2004	English	Scientific journals	26°51'22"	S	65°42'28"	W	Argentina	Tropical and Subtropical Moist Broadleaf Forests	Phytocentric
156	Sérsic, 2004	English	Scientific journals	31°28'58"	S	64°34'11"	W	Argentina	Tropical and Subtropical Dry Broadleaf Forests	Phytocentric
156	Sérsic, 2004	English	Scientific journals	31°34'34"	S	64°39'40"	W	Argentina	Tropical and Subtropical Dry Broadleaf Forests	Phytocentric
156	Sérsic, 2004	English	Scientific journals	31°44'20"	S	67°59'14"	W	Argentina	Temperate Grasslands, Savannas, and Shrublands	Phytocentric
156	Sérsic, 2004	English	Scientific journals	32°48'09"	S	70°06'06"	W	Chile	Montane Grasslands and Shrublands	Phytocentric
156	Sérsic, 2004	English	Scientific journals	32°51'49"	S	70°09'36"	W	Chile	Montane Grasslands and Shrublands	Phytocentric
156	Sérsic, 2004	English	Scientific journals	32°57'15"	S	71°04"38"	W	Chile	Temperate Broadleaf and Mixed Forests	Phytocentric
156	Sérsic, 2004	English	Scientific journals	33°35'04"	S	70°35'32"	W	Chile	Temperate Broadleaf and Mixed Forests	Phytocentric

156	Sérsic, 2004	English	Scientific journals	41°58'41"	S	71°31'45"	W	Argentina	Temperate Broadleaf and Mixed Forests	Phytocentric
156	Sérsic, 2004	English	Scientific journals	42°49'43"	S	71°38'17"	W	Argentina	Temperate Broadleaf and Mixed Forests	Phytocentric
156	Sérsic, 2004	English	Scientific journals	50°00'00"	S	73°14'57"	W	Argentina	Temperate Broadleaf and Mixed Forests	Phytocentric
157	Schaffler & Dotterl, 2011	English	Scientific journals	49°55'24"	N	11°35'07"	E	Alemanha	Temperate Broadleaf and Mixed Forests	Zoocentric
158	Simpson, 1989	English	Scientific journals	23°51'58"	S	69°08'12"	W	Chile	Deserts and Xeric Shrublands	Phytocentric
159	Mariluza & Barros, 1992	Portuguese	Scientific journals	15°55'00"	S	47°55'00"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Phytocentric
160	Rêgo & Albuquerque, 1989	Portuguese	Scientific journals	44°02'00"	S	02°25'00"	W	Brazil	Mangroves	Phytocentric
161	Miliato, 2018	-	-	20°30'00"	S	54°36'00"	W	Brazil	Tropical and subtropical grasslands, savannas, and shrublands	Phytocentric

Appendix 2: Plant metadata (World biomes: DXS = Deserts and Xeric Shrublands; FGS = Flooded Grasslands and Savannas; MAN = Mangroves; MF = Mediterranean Forests, Woodlands, and Scrub; MGS = Montane Grasslands and Shrublands; TBMF = Temperate Broadleaf and Mixed Forests; TCF = Temperate Coniferous Forests; TEG = Temperate Grasslands; TDF = Tropical and Subtropical Dry Broadleaf Forests; TRG = Tropical Grasslands; TMF = Tropical and Subtropical Moist Broadleaf Forests).

Module	Scientific name	Family	Floral resources	Flower type	World biome	Biogeographic region	Degree	z score	c score	Species role in modularity	Core-periphery group	Reference ID
1	*Cipura paludosa* Aubl.	Iridaceae	Oil	Gullet	TMF	Neotropic	1	-0.51	0.00	Peripheral	Periphery	37
2	*Lysimachia asperulifolia* Poir.	Primulaceae	Oil	Dish	TCF	Neartic	2	-0.51	0.00	Peripheral	Periphery	66
3	*Stigmaphyllon arenicola* C.E.Anderson	Malpighiaceae	Oil	Dish	TMF	Neotropic	1	-0.51	0.00	Peripheral	Periphery	115
4	*Angelonia goyazensis* Benth.	Plantaginaceae	Oil	Gullet	TRG	Neotropic	3	-0.30	0.44	Peripheral	Periphery	26
4	*Byrsonima crassa* Nied.	Malpighiaceae	Oil	Dish	TRG	Neotropic	27	-0.30	0.44	Peripheral	Core	140, 159
4	*Byrsonima coccolobifolia* Kunth	Malpighiaceae	Oil	Dish	TRG	Neotropic	39	3.12	0.49	Module hub	Core	2, 3, 8, 61, 92, 97, 138, 153, 159

4	*Byrsonima guilleminiana* A. Juss.	Malpighiaceae	Oil	Dish	TRG	Neotropic	15	6.53	0.59	Module hub	Core	159
4	*Byrsonima laxiflora* Griseb.	Malpighiaceae	Oil	Dish	TRG	Neotropic	35	3.97	0.52	Module hub	Core	61, 159
4	*Byrsonima subterranea* Brade & Markgr.	Malpighiaceae	Oil	Dish	TRG	Neotropic	22	2.90	0.37	Module hub	Core	61, 159
4	*Byrsonima umbellata* Mart. ex A. Juss.	Malpighiaceae	Oil	Dish	TRG / TMF	Neotropic	50	4.40	0.67	Network hub	Core	27, 159
4	*Byrsonima variabilis* A. Juss.	Malpighiaceae	Oil	Dish	TRG / TMF	Neotropic	15	1.41	0.52	Peripheral	Core	83, 93, 140
4	*Byrsonima verbascifolia* (L.) DC.	Malpighiaceae	Oil	Dish	TRG	Neotropic	35	4.40	0.49	Module hub	Core	61, 97, 153, 159
4	*Calydorea crocoides* Ravenna	Iridaceae	Oil	Dish	TMF	Neotropic	1	-0.51	0.00	Peripheral	Periphery	92

4	*Pterandra pyroidea* A. Juss.	Malpighiaceae	Oil	Dish	TRG	Neotropic	5	0.13	0.00	Peripheral	Periphery	81
4	*Sisyrinchium brasiliense* (Ravenna) Ravenna	Iridaceae	Oil	Dish	TRG	Neotropic	2	-0.51	0.50	Peripheral	Periphery	56
4	*Trimezia juncifolia* (Klatt) Benth. & Hook.f.	Iridaceae	Oil	Dish	TRG	Neotropic	4	0.13	0.00	Peripheral	Periphery	140
5	*Calceolaria latifolia* Benth.	Calceolariaceae	Oil	Gullet	TBMF	Neotropic	1	-0.51	0.00	Peripheral	Periphery	156
5	*Calceolaria polifolia* Hook.	Calceolariaceae	Oil	Gullet	TBMF	Neotropic	1	-0.51	0.00	Peripheral	Periphery	156
5	*Calceolaria polyrhiza* Cav.	Calceolariaceae	Oil	Gullet	TBMF	Neotropic	3	-0.51	0.00	Peripheral	Periphery	14, 156
5	*Calceolaria thyrsiflora* Graham	Calceolariaceae	Oil	Gullet	TBMF	Neotropic	1	-0.51	0.00	Peripheral	Periphery	156
5	*Calceolaria arachnoidea* Graham	Calceolariaceae	Oil	Gullet	MF/ TBMF	Neotropic	3	-0.30	0.44	Peripheral	Periphery	29, 69
5	*Calceolaria biflora* Lam.	Calceolariaceae	Oil	Gullet	TBMF	Neotropic	1	-0.51	0.00	Peripheral	Periphery	29, 70

5	*Calceolaria corymbosa* Ruiz & Pav.	Calceolariaceae	Oil	Gullet	MGS/ TBMF	Neotropic	2	-0.09	0.00	Peripheral	Periphery	29, 70
5	*Calceolaria crenatiflora* Cav.	Calceolariaceae	Oil	Gullet	TBMF	Neotropic	1	0.13	0.00	Peripheral	Periphery	29, 70
5	*Calceolaria filicaulis* Clos	Calceolariaceae	Oil	Gullet	MGS/ TBMF / TEG	Neotropic	4	-0.51	0.00	Peripheral	Periphery	29, 69, 70, 156
5	*Calceolaria paralia* Cav.	Calceolariaceae	Oil	Gullet	MGS/ TBMF	Neotropic	1	-0.51	0.00	Peripheral	Periphery	29, 70
5	*Calceolaria purpurea* Graham	Calceolariaceae	Oil	Gullet	TBMF	Neotropic	1	-0.51	0.00	Peripheral	Periphery	29
5	*Calceolaria valdiviana* Phil.	Calceolariaceae	Oil	Gullet	TBMF	Neotropic	1	-0.51	0.00	Peripheral	Periphery	29, 156
5	*Monttea chilensis* J.Gay	Plantaginaceae	Oil	Gullet	MF	Neotropic	2	0.98	0.20	Peripheral	Periphery	155
5	*Sisyrinchium arenarium* Poepp.	Iridaceae	Oil	Dish	TBMF	Neotropic	1	-0.51	0.00	Peripheral	Periphery	12

6	*Calceolaria hypericina* Poepp. Ex Benth.	Calceolariaceae	Oil	Gullet	MGS	Neotropic	1	-0.09	0.00	Peripheral	Periphery	156
7	*Angelonia hirta* Cham.	Plantaginaceae	Oil	Gullet	DXS	Neotropic	7	0.13	0.57	Peripheral	Periphery	133
7	*Banisteriopsis gardneriana* (A. Juss.) W.R.Anderson & B.Gates	Malpighiaceae	Oil	Dish	TMF	Neotropic	1	-0.51	0.00	Peripheral	Periphery	150
7	*Banisteriopsis nummifera* (A. Juss.) B. Gates	Malpighiaceae	Oil	Dish	TRG	Neotropic	5	-0.09	0.56	Peripheral	Periphery	61
7	*Banisteriopsis schizoptera* (A. Juss.) B. Gates	Malpighiaceae	Oil	Dish	DXS / TRG	Neotropic	14	0.77	0.56	Peripheral	Core	5, 59, 61
7	*Banisteriopsis stellaris* (Griseb.) B. Gates	Malpighiaceae	Oil	Dish	DXS / TRG	Neotropic	11	0.56	0.56	Peripheral	Core	5, 59, 61, 106, 138, 141
7	*Barnebya harleyi* W.R. Anderson & B. Gates	Malpighiaceae	Oil	Dish	DXS	Neotropic	1	-0.51	0.00	Peripheral	Periphery	52
7	*Bunchosia lindeniana* A.Juss.	Malpighiaceae	Oil	Dish	TMF	Neotropic	1	-0.51	0.00	Peripheral	Periphery	102

7	*Bunchosia swartziana* Griseb.	Malpighiaceae	Oil	Dish	TMF	Neotropic	1	-0.51	0.00	Peripheral	Periphery	102
7	*Byrsonima cydoniifolia* A.Juss.	Malpighiaceae	Oil	Dish	FGS	Neotropic	26	0.77	0.37	Peripheral	Core	38, 47, 87, 135, 162
7	*Byrsonima gardneriana* A. Juss.	Malpighiaceae	Oil	Dish	DXS	Neotropic	14	-0.51	0.44	Peripheral	Core	4, 5, 15, 151
7	*Byrsonima amoena* Cuatrec.	Malpighiaceae	Oil	Dish	TRG / TMF	Neotropic	3	3.76	0.37	Module hub	Periphery	91, 137
7	*Byrsonima microphylla* A. Juss.	Malpighiaceae	Oil	Dish	TMF	Neotropic	6	0.56	0.00	Peripheral	Periphery	15
7	*Byrsonima sericea* DC.	Malpighiaceae	Oil	Dish	DXS / TRG / TMF	Neotropic	64	8.67	0.48	Module hub	Core	15, 17, 47, 48, 54, 78, 84, 86, 87, 91, 94, 136, 142, 144, 148, 150
7	*Carolus chasei* (W.R.Anderson) W.R.Anderson	Malpighiaceae	Oil	Dish	DXS	Neotropic	5	0.13	0.32	Peripheral	Periphery	5, 59

7	*Diplopterys pubipetala* (A. Juss.) W.R. Anderson & C. Davis	Malpighiaceae	Oil	Dish	DXS / TRG / TMF	Neotropic	26	1.41	0.63	Connectors	Core	5, 34, 40, 52, 59, 61, 74, 97, 136, 141, 161
7	*Gomesa bifolia* (Sims) M.W. Chase & N.H. Williams	Orchidaceae	Oil	Flag	TMF	Neotropic	1	-0.51	0.00	Peripheral	Periphery	128
7	*Heteropterys alternifolia* W.R. Anderson	Malpighiaceae	Oil	Dish	TMF	Neotropic	10	0.13	0.50	Peripheral	Core	15
7	*Heteropterys brachiata* (L.) DC.	Malpighiaceae	Oil	Dish	TMF	Neotropic	1	-0.51	0.00	Peripheral	Periphery	102
7	*Heteropterys byrsonimifolia* A. Juss.	Malpighiaceae	Oil	Dish	TRG / TMF	Neotropic	17	1.20	0.58	Peripheral	Core	44, 89, 92, 97, 104, 108, 136, 141
7	*Heteropterys intermedia* (A. Juss.) Griseb.	Malpighiaceae	Oil	Dish	TMF	Neotropic	10	0.13	0.58	Peripheral	Periphery	39, 40, 51
7	*Heteropterys nervosa* A. Juss.	Malpighiaceae	Oil	Dish	TRG	Neotropic	1	-0.51	0.00	Peripheral	Periphery	61

7	*Hiraea cuneata* Griseb.	Malpighiaceae	Oil	Dish	TRG	Neotropic	2	-0.51	0.50	Peripheral	Periphery	79
7	*Hiraea obovate* Huber	Malpighiaceae	Oil	Dish	TMF	Neotropic	1	-0.51	0.00	Peripheral	Periphery	102
7	*Janusia anisandra* (A. Juss.) Griseb.	Malpighiaceae	Oil	Dish	DXS	Neotropic	3	-0.09	0.00	Peripheral	Periphery	5, 59
7	*Krameria bahiana* B.B. Simpson	Krameriaceae	Oil	Dish	TMF	Neotropic	6	0.56	0.00	Peripheral	Periphery	20, 142
7	*Lophanthera lactescens* Ducke	Malpighiaceae	Oil	Dish	TRG	Neotropic	1	-0.51	0.00	Peripheral	Periphery	141
7	*Macairea radula* (Bonpl.) DC.	Melastomataceae	Oil	Dish	TRG	Neotropic	1	-0.51	0.00	Peripheral	Periphery	101
7	*Malpighia emarginata* DC.	Malpighiaceae	Oil	Dish	DXS / TRG / TMF	Neotropic	41	3.76	0.59	Module hub	Core	19, 43, 44, 65, 68, 75, 86, 88, 89, 98, 99, 102, 103, 104, 108, 118, 150, 152
7	*Malpighia lundellii* C.V. Morton	Malpighiaceae	Oil	Dish	TMF	Neotropic	1	-0.51	0.00	Peripheral	Periphery	102

7	*Mcvaughia bahiana* W.R. Anderson	Malpighiaceae	Oil	Dish	DXS	Neotropic	1	-0.51	0.00	Peripheral	Periphery	136
7	*Peixotoa hispidula* A. Juss.	Malpighiaceae	Oil	Dish	DXS	Neotropic	1	-0.51	0.00	Peripheral	Periphery	53
7	*Stigmaphyllon calcaratum* N.E. Br.	Malpighiaceae	Oil	Dish	FGS	Neotropic	2	-0.51	0.00	Peripheral	Periphery	135, 162
7	*Stigmaphyllon tomentosum* A.Juss.	Malpighiaceae	Oil	Dish	TRG	Neotropic	2	0.56	0.00	Peripheral	Periphery	141
7	*Stigmaphyllon auriculatum* (Cav.) A. Juss.	Malpighiaceae	Oil	Dish	DXS	Neotropic	6	0.98	0.59	Peripheral	Periphery	5, 46, 59, 92
7	*Stigmaphyllon blanchetii* C.E. Anderson	Malpighiaceae	Oil	Dish	TMF	Neotropic	1	-0.30	0.00	Peripheral	Periphery	54
7	*Stigmaphyllon bonariense* (Hook. & Arn.) C.E. Anderson	Malpighiaceae	Oil	Dish	FGS / TEG / TMF	Neotropic	13	-0.30	0.00	Peripheral	Core	129
7	*Stigmaphyllon cavernulosum* C.E. Anderson	Malpighiaceae	Oil	Dish	TMF	Neotropic	2	-0.09	0.00	Peripheral	Periphery	86
7	*Stigmaphyllon ciliatum* (Lam.) A. Juss.	Malpighiaceae	Oil	Dish	DXS	Neotropic	3	0.56	0.24	Peripheral	Periphery	5, 59

7	*Stigmaphyllon jatrophifolium* A. Juss.	Malpighiaceae	Oil	Dish	FGS / TEG / TRG	Neotropic	7	2.05	0.48	Peripheral	Periphery	129
7	*Stigmaphyllon paralias* A. Juss.	Malpighiaceae	Oil	Dish	DXS / TMF	Neotropic	10	-0.30	0.00	Peripheral	Core	5, 15, 48, 139
7	*Tetrapterys jussieuana* Nied.	Malpighiaceae	Oil	Dish	TRG	Neotropic	1	-0.51	0.00	Peripheral	Periphery	61
7	*Tetrapterys schiedeana* Schltdl. & Cham.	Malpighiaceae	Oil	Dish	TMF	Neotropic	1	-0.51	0.00	Peripheral	Periphery	102
7	*Tibouchina cerastifolia* Cogn.	Melastomataceae	Oil	Dish	TMF	Neotropic	1	-0.51	0.00	Peripheral	Periphery	45
8	*Angelonia integerrima* Spreng.	Plantaginaceae	Oil	Gullet	TRG	Neotropic	21	2.26	0.51	Peripheral	Core	21, 26, 36, 56, 76
8	*Aspicarpa pulchella* (Griseb.) O'Donell & Lourteig	Malpighiaceae	Oil	Dish	TRG	Neotropic	2	-0.51	0.50	Peripheral	Periphery	21, 56

8	*Byrsonima psilandra* Griseb.	Malpighiaceae	Oil	Dish	TRG	Neotropic	4	-0.30	0.63	Connectors	Periphery	21, 56
8	*Gelasine coerulea* (Vell.) Ravena	Iridaceae	Oil	Dish	TRG	Neotropic	4	-0.09	0.38	Peripheral	Periphery	56
8	*Herbertia pulchella* Sweet	Iridaceae	Oil	Dish	TRG	Neotropic	3	-0.30	0.44	Peripheral	Periphery	76
8	*Kelissa brasiliensis* (Baker) Ravenna	Iridaceae	Oil	Dish	TRG	Neotropic	2	-0.30	0.00	Peripheral	Periphery	76
8	*Mecardonia procumbens* (Mill.) Small	Plantaginaceae	Nectar, Oil	Gullet	TMF	Neotropic	15	2.26	0.12	Peripheral	Core	80
8	*Sisyrinchium vaginatum* Spreng.	Iridaceae	Oil	Dish	TRG	Neotropic	9	0.56	0.49	Peripheral	Periphery	56
8	*Trichocentrum pumilum* (Lindl.) M.W. Chase & N.H. Williams	Orchidaceae	Oil	Flag	TRG	Neotropic	2	-0.51	0.50	Peripheral	Periphery	32
8	*Trimezia spathata* (Klatt) Baker	Iridaceae	Oil	Dish	TMF	Neotropic	1	-0.51	0.00	Peripheral	Periphery	67
8	*Zygostates alleniana* Kraenzl.	Orchidaceae	Oil	Flag	TMF	Neotropic	1	-0.51	0.00	Peripheral	Periphery	67

9	*Alicia anisopetala* (A. Juss.) WR Anderson	Malpighiaceae	Oil	Dish	TMF	Neotropic	11	1.20	0.30	Peripheral	Core	40, 51, 160
9	*Angelonia eriostachys* Benth.	Plantaginaceae	Oil	Gullet	TRG	Neotropic	4	-0.30	0.63	Connectors	Periphery	26
9	*Banisteriopsis aphrodisiaca**	Malpighiaceae	Oil	Dish	TRG	Neotropic	4	1.62	0.48	Peripheral	Periphery	161
9	*Banisteriopsis adenopoda* (A. Juss.) B. Gates	Malpighiaceae	Oil	Dish	TRG / TMF	Neotropic	16	-0.30	0.50	Peripheral	Core	40, 70, 138, 141, 145
9	*Banisteriopsis anisandra* (A. Juss.) B. Gates	Malpighiaceae	Oil	Dish	TRG	Neotropic	4	-0.09	0.38	Peripheral	Periphery	61, 141
9	*Banisteriopsis argyrophylla* (A. Juss.) B. Gates	Malpighiaceae	Oil	Dish	TRG	Neotropic	6	-0.09	0.61	Peripheral	Periphery	61, 138, 141
9	*Banisteriopsis campestris* (A. Juss.) Little	Malpighiaceae	Oil	Dish	TRG / TMF	Neotropic	23	2.90	0.42	Module hub	Core	8, 57, 58, 61, 74

9	*Banisteriopsis laevifolia* (A. Juss.) B. Gates	Malpighiaceae	Oil	Dish	TRG / TMF	Neotropic	17	1.20	0.60	Peripheral	Core	61, 74, 146
9	*Banisteriopsis malifolia* (Nees & Mart.) B. Gates	Malpighiaceae	Oil	Dish	TRG	Neotropic	40	4.61	0.54	Module hub	Core	57, 58, 61, 64, 104, 107, 108, 113, 141, 145
9	*Banisteriopsis megaphylla* (A. Juss.) B. Gates	Malpighiaceae	Oil	Dish	TRG	Neotropic	4	-0.09	0.38	Peripheral	Periphery	61, 146
9	*Banisteriopsis muricata* (Cav.) Cuatrec.	Malpighiaceae	Oil	Dish	DXS / TMF	Neotropic	22	1.41	0.61	Peripheral	Core	5, 39, 40, 51, 52, 53, 59
9	*Banisteriopsis oxyclada* (A. Juss.) B. Gates	Malpighiaceae	Oil	Dish	TRG	Neotropic	12	0.98	0.44	Peripheral	Core	97, 141, 145
9	*Banisteriopsis variabilis* B. Gates	Malpighiaceae	Oil	Dish	TRG	Neotropic	13	0.77	0.50	Peripheral	Core	61, 64
9	*Bunchosia pallescens* Skottsb.	Malpighiaceae	Oil	Dish	TMF	Neotropic	1	-0.51	0.00	Peripheral	Periphery	51

9	*Byrsonima intermedia* A.Juss.	Malpighiaceae	Oil	Dish	TRG	Neotropic	57	4.19	0.56	Module hub	Core	13, 25, 31, 56, 63, 71, 74, 91, 92, 97, 113, 136, 138, 141, 145, 161
9	*Byrsonima basiloba* A. Juss.	Malpighiaceae	Oil	Dish	TRG / TMF	Neotropic	9	4.61	0.57	Module hub	Periphery	8, 13, 61
9	*Byrsonima brachybotrya*Nied.	Malpighiaceae	Oil	Dish	TRG	Neotropic	3	-0.51	0.00	Peripheral	Periphery	8, 21
9	*Byrsonima pachyphylla* A. Juss.	Malpighiaceae	Oil	Dish	TRG	Neotropic	13	0.56	0.70	Connectors	Core	25, 61
9	*Byrsonima rigida* A. Juss.	Malpighiaceae	Oil	Dish	TRG	Neotropic	4	-0.09	0.38	Peripheral	Periphery	61

9	*Byrsonima vacciniifolia* A. Juss.	Malpighiaceae	Oil	Dish	DXS / TRG / TMF	Neotropic	8	0.34	0.47	Peripheral	Periphery	52, 53, 75, 97
9	*Dicella bracteosa* (A. Juss.) Griseb.	Malpighiaceae	Oil	Dish	DXS / TMF	Neotropic	15	0.98	0.55	Peripheral	Core	5, 40
9	*Diplopterys lutea* (Griseb.) W.R.Anderson & C.Davis	Malpighiaceae	Oil	Dish	TMF	Neotropic	4	-0.09	0.38	Peripheral	Periphery	40
9	*Heteropterys argyrophaea* A.Juss.	Malpighiaceae	Oil	Dish	TRG	Neotropic	6	1.20	0.18	Peripheral	Periphery	161
9	*Heteropterys campestris* A. Juss.	Malpighiaceae	Oil	Dish	TRG	Neotropic	2	-0.30	0.00	Peripheral	Periphery	61
9	*Heteropterys pteropetala* A. Juss.	Malpighiaceae	Oil	Dish	TRG / TMF	Neotropic	9	0.56	0.49	Peripheral	Periphery	61, 89, 141

9	*Heteropterys tomentosa* A. Juss.	Malpighiaceae	Oil	Dish	TRG	Neotropic	4	-0.30	0.50	Peripheral	Periphery	8, 61
9	*Heteropterys umbellata* A. Juss.	Malpighiaceae	Oil	Dish	TRG	Neotropic	5	-0.30	0.48	Peripheral	Periphery	97
9	*Mascagnia cordifolia* (A. Juss.) Griseb.	Malpighiaceae	Oil	Dish	TRG / TMF	Neotropic	10	0.98	0.32	Peripheral	Core	40, 51, 97, 141
9	*Mascagnia sepium* (A. Juss.) Griseb.	Malpighiaceae	Oil	Dish	TMF	Neotropic	2	-0.51	0.50	Peripheral	Periphery	40
9	*Niedenzuella acutifolia* (Cav.) W.R.Anderson	Malpighiaceae	Oil	Dish	TMF	Neotropic	12	1.20	0.38	Peripheral	Core	40, 51, 114
9	*Niedenzuella multiglandulosa* (A. Juss.) W.R.Anderson	Malpighiaceae	Oil	Dish	TMF	Neotropic	1	-0.51	0.00	Peripheral	Periphery	51
9	*Peixotoa goiana* C.E.Anderson	Malpighiaceae	Oil	Dish	TRG	Neotropic	5	-0.09	0.56	Peripheral	Periphery	8, 61
9	*Peixotoa reticulata* Griseb.	Malpighiaceae	Oil	Dish	TRG	Neotropic	23	1.84	0.61	Peripheral	Core	61, 138, 141, 145, 161

9	*Peixotoa tomentosa* A. Juss.	Malpighiaceae	Oil	Dish	TRG	Neotropic	14	1.20	0.50	Peripheral	Core	57, 97
9	*Stigmaphyllon lalandianum* A. Juss.	Malpighiaceae	Oil	Dish	TRG / TMF	Neotropic	19	1.20	0.18	Peripheral	Core	40, 141, 145
9	*Tetrapterys ambigua* (A. Juss.) Nied.	Malpighiaceae	Oil	Dish	TRG	Neotropic	2	-0.51	0.50	Peripheral	Periphery	61
9	*Tetrapterys phlomoides* (Spreng.) Nied.	Malpighiaceae	Oil	Dish	TMF	Neotropic	9	0.56	0.44	Peripheral	Core	40, 51
10	*Ceratandra grandiflora* Lindl.	Orchidaceae	Oil	Gullet	MF	Paleotropic	2	-0.30	0.00	Peripheral	Periphery	121
11	*Cypella fucata* Ravenna	Iridaceae	Oil	Dish	TRG	Neotropic	1	-0.51	0.00	Peripheral	Periphery	76
11	*Cypella herbertii* Hook.	Iridaceae	Nectar, Oil	Dish	TEG / TRG / TMF	Neotropic	6	0.34	0.28	Peripheral	Periphery	16, 76, 92

11	*Herbertia lahue* (Molina) Goldblatt	Iridaceae	Oil	Dish	TEG / TRG	Neotropic	4	-0.09	0.38	Peripheral	Periphery	16, 76
11	*Nierembergia calycina* Hook.	Solanaceae	Oil	Bell	TRG	Neotropic	4	-0.09	0.38	Peripheral	Periphery	76
11	*Sisyrinchium chilense* Hook.	Iridaceae	Oil	Dish	TDF	Neotropic	1	-0.51	0.00	Peripheral	Periphery	12
11	*Sisyrinchium fasciculatum* Klatt	Iridaceae	Oil	Dish	TRG	Neotropic	1	-0.51	0.00	Peripheral	Periphery	76
11	*Sisyrinchium laxum* Otto ex Sims	Iridaceae	Oil	Dish	MGS/ TDF	Neotropic	1	-0.30	0.00	Peripheral	Periphery	12
11	*Sisyrinchium micranthum* Cav.	Iridaceae	Oil	Dish	TRG	Neotropic	7	0.56	0.24	Peripheral	Periphery	56, 76
11	*Sisyrinchium pachyrhizum* Baker	Iridaceae	Oil	Dish	TRG / TMF	Neotropic	3	-0.09	0.00	Peripheral	Periphery	12, 76

11	*Sisyrinchium platense* I.M. Johnst.	Iridaceae	Nectar, Oil	Dish	TEG	Neotropic	1	-0.51	0.00	Peripheral	Periphery	16
11	*Sisyrinchium setaceum* Klatt	Iridaceae	Oil	Dish	TRG	Neotropic	2	-0.30	0.00	Peripheral	Periphery	12
12	*Lysimachia punctata* L.	Primulaceae	Oil	Bell	TBMF	Paleartic	1	-0.30	0.00	Peripheral	Periphery	157
13	*Lysimachia ciliate* L.	Primulaceae	Oil	Dish	TBMF	Neartic	1	-0.51	0.00	Peripheral	Periphery	7
14	*Grobya amherstiae* Lindl.	Orchidaceae	Oil	Flag	TMF	Neotropic	1	-0.51	0.00	Peripheral	Periphery	28
15	*Angelonia campestris* Nees & Mart.	Plantaginaceae	Oil	Gullet	DXS	Neotropic	4	-0.30	0.63	Connectors	Periphery	133
15	*Angelonia cornigera* Hook.	Plantaginaceae	Oil	Gullet	DXS / TMF	Neotropic	5	-0.09	0.48	Peripheral	Periphery	23, 26, 142, 150
15	*Angelonia pubescens* Benth.	Plantaginaceae	Oil	Gullet	DXS / TRG	Neotropic	4	-0.09	0.38	Peripheral	Periphery	26, 133

15	*Angelonia salicariifolia* Bonpl.	Plantaginaceae	Oil	Gullet	DXS / TRG / TMF	Neotropic	7	0.13	0.49	Peripheral	Periphery	1, 26, 49
15	*Basistemon silvaticus* (Herzog) Baehni & J.F.Macbr.	Plantaginaceae	Oil	Gullet	TRG	Neotropic	4	0.13	0.00	Peripheral	Periphery	26
15	*Krameria grandiflora* A. St.-Hil.	Krameriaceae	Oil	Dish	DXS / FGS / TDF / TRG / TMF	Neotropic	14	0.77	0.64	Connectors	Core	10, 36

15	*Krameria tomentosa* A. St.-Hil.	Krameriaceae	Oil	Dish	DXS / TRG / TMF	Neotropic	18	0.13	0.75	Connectors	Core	9, 36, 52
15	*Monopera perennis* (Hassl.) Barringer	Plantaginaceae	Oil	Flag	TRG	Neotropic	2	-0.30	0.00	Peripheral	Periphery	1
16	*Sisyrinchium restioides* Spreng.	Iridaceae	Oil	Dish	TRG	Neotropic	1	-0.51	0.00	Peripheral	Periphery	56
17	*Ixianthes retzioides* Benth.	Stilbaceae	Oil	Gullet	MF	Paleotropic	1	-0.51	0.00	Peripheral	Periphery	125
17	*Tritoniopsis parviflora* (Jacq.) G.J. Lewis	Iridaceae	Nectar, Oil	Gullet	MF	Paleotropic	1	-0.51	0.00	Peripheral	Periphery	24
18	*Colpias mollis* E. Mey. ex Benth.	Scrophulariaceae	Oil	Gullet	DXS	Paleotropic	2	-0.30	0.00	Peripheral	Periphery	126
18	*Corycium orobanchoides* (L. f.) Sw.	Orchidaceae	Oil	Gullet	MF	Paleotropic	1	-0.51	0.00	Peripheral	Periphery	33
18	*Diascia cardiosepala* Hiern	Scrophulariaceae	Oil	Gullet	DXS	Paleotropic	5	0.34	0.00	Peripheral	Periphery	22, 55
18	*Diascia floribunda* K.E. Steiner	Scrophulariaceae	Oil	Gullet	DXS	Paleotropic	5	0.34	0.00	Peripheral	Periphery	22

18	*Disperis bolusiana* Schltr.	Orchidaceae	Oil	Flag	MF	Paleotropic	1	-0.51	0.00	Peripheral	Periphery	33
18	*Hemimeris centrodes* Hiern	Scrophulariaceae	Oil	Gullet	DXS	Paleotropic	1	-0.51	0.00	Peripheral	Periphery	55
18	*Hemimeris racemosa* (Houtt.) Merr.	Scrophulariaceae	Oil	Gullet	DXS / MF	Paleotropic	5	0.34	0.00	Peripheral	Periphery	33, 105, 126
18	*Hemimeris sabulosa* L. f.	Scrophulariaceae	Oil	Gullet	MF	Paleotropic	1	-0.51	0.00	Peripheral	Periphery	105
18	*Pterygodium alatum* (Thunb.) Sw.	Orchidaceae	Oil	Flag	MF	Paleotropic	1	-0.51	0.00	Peripheral	Periphery	33
18	*Pterygodium caffrum* (L.) Sw.	Orchidaceae	Oil	Flag	MF	Paleotropic	1	-0.51	0.00	Peripheral	Periphery	33
18	*Pterygodium catholicum* (L.) Sw.	Orchidaceae	Oil	Flag	MF	Paleotropic	1	-0.51	0.00	Peripheral	Periphery	33
19	*Diascia longicornis* Druce	Scrophulariaceae	Oil	Gullet	MF	Paleotropic	1	-0.51	0.00	Peripheral	Periphery	33
20	*Corycium dracomontanum* Parkman & Schelpe	Orchidaceae	Oil	Gullet	MGS	Paleotropic	1	-0.51	0.00	Peripheral	Periphery	122
20	*Diascia anastrepta* Hilliard & B.L. Burtt	Scrophulariaceae	Oil	Gullet	MF/ MGS	Paleotropic	2	-0.30	0.00	Peripheral	Periphery	122, 123, 124

20	*Diascia austromontana* KE Steiner	Scrophulariaceae	Oil	Gullet	MGS	Paleotropic	1	-0.51	0.00	Peripheral	Periphery	123
20	*Diascia barberae* Hook. f.	Scrophulariaceae	Oil	Gullet	MF/ MGS	Paleotropic	2	-0.30	0.00	Peripheral	Periphery	123, 124
20	*Diascia capsularis* Benth.	Scrophulariaceae	Oil	Gullet	DXS / MF/ MGS	Paleotropic	1	-0.51	0.00	Peripheral	Periphery	123
20	*Diascia cordata* N.E. Br.	Scrophulariaceae	Oil	Gullet	MGS	Paleotropic	1	-0.51	0.00	Peripheral	Periphery	123
20	*Diascia fetcaniensis* Hilliard & BL Burtt	Scrophulariaceae	Oil	Gullet	MGS	Paleotropic	1	-0.51	0.00	Peripheral	Periphery	123
20	*Diascia integerrima* E.Mey. ex Benth.	Scrophulariaceae	Oil	Gullet	MGS	Paleotropic	2	-0.30	0.00	Peripheral	Periphery	123, 124
20	*Diascia megathura* Hilliard & BL Burtt	Scrophulariaceae	Oil	Gullet	MGS	Paleotropic	1	-0.51	0.00	Peripheral	Periphery	123
20	*Diascia purpurea* N.E. Br.	Scrophulariaceae	Oil	Gullet	MGS	Paleotropic	1	-0.51	0.00	Peripheral	Periphery	122
20	*Diascia rigescens* E. Mey. ex Benth.	Scrophulariaceae	Oil	Gullet	MGS	Paleotropic	1	-0.51	0.00	Peripheral	Periphery	123
20	*Diascia stachyoides* Schltr. ex Hiern	Scrophulariaceae	Oil	Gullet	MGS	Paleotropic	1	-0.51	0.00	Peripheral	Periphery	123

20	*Diascia tugelensis* Hilliard & B.L. Burtt	Scrophulariaceae	Oil	Gullet	MGS	Paleotropic	1	-0.51	0.00	Peripheral	Periphery	123
20	*Diascia vigilis* Hilliard & B.L. Burtt	Scrophulariaceae	Oil	Gullet	MGS	Paleotropic	1	-0.51	0.00	Peripheral	Periphery	119, 122, 123
20	*Huttonaea fimbriata* (Harv.) Rchb. f.	Orchidaceae	Oil	Flag	MGS	Paleotropic	3	-0.09	0.00	Peripheral	Periphery	122
20	*Huttonaea grandiflora* (Schltr.) Rolfe	Orchidaceae	Oil	Flag	MGS	Paleotropic	2	-0.30	0.00	Peripheral	Periphery	122
20	*Huttonaea pulchra* Harv.	Orchidaceae	Oil	Flag	MGS	Paleotropic	3	-0.09	0.00	Peripheral	Periphery	122
21	*Bowkeria citrina* Thode	Stilbaceae	Oil	Gullet	MGS	Paleotropic	1	-0.51	0.00	Peripheral	Periphery	124
21	*Bowkeria verticillata* Druce	Stilbaceae	Oil	Gullet	MGS	Paleotropic	1	-0.51	0.00	Peripheral	Periphery	124
22	*Calceolaria parviflora* Gillies ex Benth.	Calceolariaceae	Oil	Gullet	TDF	Neotropic	1	-0.30	0.00	Peripheral	Periphery	156
22	*Calceolaria pinifolia* Cav.	Calceolariaceae	Oil	Gullet	TEG	Neotropic	1	-0.51	0.00	Peripheral	Periphery	156
22	*Calceolaria plectranthifolia* Walp.	Calceolariaceae	Oil	Gullet	TMF	Neotropic	1	0.13	0.00	Peripheral	Periphery	156
22	*Calceolaria polyclada* Kraenzl.	Calceolariaceae	Oil	Gullet	MGS	Neotropic	2	-0.51	0.00	Peripheral	Periphery	156

22	*Calceolaria schickendantziana* Kraenzl.	Calceolariaceae	Oil	Gullet	TMF	Neotropic	3	-0.51	0.00	Peripheral	Periphery	156
22	*Calceolaria teucrioides* Griseb.	Calceolariaceae	Oil	Gullet	MGS/ TDF	Neotropic	4	-0.51	0.00	Peripheral	Periphery	156
22	*Calceolaria umbellata* Wedd.	Calceolariaceae	Oil	Gullet	MGS	Neotropic	1	-0.51	0.00	Peripheral	Periphery	156
22	*Janusia guaranitica* (A. St.-Hil.) A. Juss.	Malpighiaceae	Oil	Dish	TRG / TMF	Neotropic	2	-0.51	0.50	Peripheral	Periphery	45, 76
22	*Monttea schickendantzii* Griseb.	Plantaginaceae	Oil	Gullet	TDF	Neotropic	2	-0.30	0.00	Peripheral	Periphery	155
22	*Monttea aphylla* (Miers) Benth. & Hook. f.	Plantaginaceae	Nectar, Oil	Gullet	MGS/ TEG / TDF	Neotropic	9	-0.30	0.00	Peripheral	Periphery	18, 41, 77, 155
22	*Nierembergia aristata* D. Don	Solanaceae	Oil	Bell	TDF	Neotropic	2	-0.51	0.00	Peripheral	Periphery	11

22	*Nierembergia linariifolia* Graham	Solanaceae	Oil	Bell	TEG / TDF	Neotropic	8	0.77	0.22	Peripheral	Periphery	11, 30, 50
23	*Calceolaria uniflora* Lam.	Calceolariaceae	Oil	Gullet	TBMF	Neotropic	1	-0.30	0.00	Peripheral	Periphery	156
24	*Byrsonima crassifolia* (L.) Kunth	Malpighiaceae	Oil	Dish	DXS / MAN / TDF / TRG / TMF	Neotropic	43	1.84	0.26	Peripheral	Core	62, 73, 85, 91, 117, 127, 131, 160
24	*Byrsonima crispa* A. Juss.	Malpighiaceae	Oil	Dish	TMF	Neotropic	1	2.05	0.24	Peripheral	Periphery	127
24	*Byrsonima lucida* (Mill.) DC.	Malpighiaceae	Oil	Dish	TBMF	Neartic	4	-0.09	0.38	Peripheral	Periphery	82
24	*Byrsonima rotunda* Griseb.	Malpighiaceae	Oil	Dish	TRG / TMF	Neotropic	15	0.98	0.59	Peripheral	Core	27, 62

24	*Byrsonima spicata* (Cav.) Rich. Ex Kunth	Malpighiaceae	Oil	Dish	TRG / TMF	Neotropic	17	0.98	0.55	Peripheral	Core	35, 62
24	*Drymonia serrulata* (Jacq.) Mart.	Gesneriaceae	Nectar, Oil	Gullet	TMF	Neotropic	19	3.12	0.10	Module hub	Core	42
24	*Mouriri guianensis* Aubl.	Melastomataceae	Oil	Dish	TMF	Neotropic	4	-0.09	0.38	Peripheral	Periphery	100
24	*Mouriri myrtilloides* Poir.	Melastomataceae	Nectar, Oil	Dish	TMF	Neotropic	6	0.56	0.00	Peripheral	Periphery	6
24	*Spachea membranacea* Cuatrec.	Malpighiaceae	Oil	Dish	TMF	Neotropic	7	0.56	0.24	Peripheral	Periphery	154
24	*Trichocentrum stipitatum* (Lindl.) M.W.Chase & N.H.Williams	Orchidaceae	Oil	Flag	TMF	Neotropic	4	-0.30	0.63	Connectors	Periphery	117
25	*Bunchosia armeniaca* (Cav.) DC.	Malpighiaceae	Oil	Dish	TRG	Neotropic	1	-0.51	0.00	Peripheral	Periphery	143
25	*Malpighia glabra* L.	Malpighiaceae	Oil	Dish	TMF	Neotropic	116	0.13	0.63	Connectors	Periphery	102, 147

Appendix 2: Animal metadata (World biomes: DXS = Deserts and Xeric Shrublands; FGS = Flooded Grasslands and Savannas; MAN = Mangroves; MF = Mediterranean Forests, Woodlands, and Scrub; MGS = Montane Grasslands and Shrublands; TBMF = Temperate Broadleaf and Mixed Forests; TCF = Temperate Coniferous Forests; TEG = Temperate Grasslands; TDF = Tropical and Subtropical Dry Broadleaf Forests; TRG = Tropical Grasslands; TMF = Tropical and Subtropical Moist Broadleaf Forests).

Module	Floral visitors species	Floral visitors group	Oil-collecting tribe/subfamily	Resources collected	World biomes	Biogeographic region	Degree	z score	c score	Species role in modularity	Core-periphery group	Reference ID
1	*Augochlora thalia* Smith, 1879	Bees	-	Not available	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	80
2	*Augochlorella gratiosa* (Smith, 1853)	Bees	-	Pollen	TCF	Neartic	1	-0,51	0,00	Peripheral	Periphery	66
2	*Augochlorella striata* (Packer, 1990)	Bees	-	Pollen	TCF	Neartic	1	-0,51	0,00	Peripheral	Periphery	66
3	*Centris conspersa* Mocsáry, 1899	Bees	Centridini	Pollen	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	115
4	*Apis mellifera* Linnaeus, 1758	Bees	-	Pollen	DXS / FGS / MGS / TBMF / TEG / TDF / TRG / TMF	Neartic / Neotropic	28	0,98	0,80	Connectors	Core	3, 4, 5, 9, 15, 16, 18, 19, 25, 50, 56, 59, 71, 79, 80, 81, 82, 87, 88, 135, 146, 147, 153, 159, 161
4	*Augochloropsis cleopatra* (Schrottky, 1902)	Bees	-	Pollen	TRG	Neotropic	7	0,77	0,00	Peripheral	Periphery	140, 159

4	*Augochloropsis cognata* Moure, 1944	Bees	-	Pollen	TRG	Neotropic	2	-0,30	0,00	Peripheral	Periphery	56, 83
4	*Augochloropsis smithiana* (Cockerell, 1900)	Bees	-	Pollen	TRG	Neotropic	9	0,77	0,35	Peripheral	Core	64, 74, 159
4	*Bombus brevivillus* Franklin, 1913	Bees	-	Pollen	TRG / TMF	Neotropic	9	0,98	0,20	Peripheral	Core	81, 147, 159
4	*Bombus morio* (Swederus, 1787)	Bees	-	Pollen	TRG	Neotropic	9	0,98	0,20	Peripheral	Core	81, 138, 159
4	*Brachygastra lecheguana* (Latreille, 1824)	Wasp	-	NA	TRG / TMF	Neotropic	5	0,13	0,32	Peripheral	Periphery	92, 159
4	*Brachygastra moebiana* (de Saussure, 1867)	Wasp	-	NA	TRG	Neotropic	2	-0,30	0,00	Peripheral	Periphery	159
4	*Centris burgdorfi* Friese, 1900	Bees	Centridini	Oil, Pollen	DXS / FGS / TRG / TMF	Neotropic	18	0,77	0,75	Connectors	Core	9, 10, 21, 26, 36, 61, 129, 141, 159
4	*Centris cockerelli* Fox, 1899	Bees	Centridini	Oil, Pollen	TRG	Neotropic	6	0,56	0,00	Peripheral	Periphery	159
4	*Centris discolor* Smith, 1874	Bees	Centridini	Oil, Pollen	TRG	Neotropic	9	0,34	0,57	Peripheral	Core	40, 56, 83, 159
4	*Centris iheringi**	Bees	Centridini	Oil, Pollen	TRG	Neotropic	6	0,56	0,00	Peripheral	Periphery	159
4	*Centris insularis* Smith, 1874	Bees	Centridini	NA	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	83
4	*Centris klugii* Friese, 1899	Bees	Centridini	Oil	TRG	Neotropic	2	-0,30	0,00	Peripheral	Periphery	26, 83

4	*Epicharis iheringii* Friese, 1899	Bees	Centridini	Oil, Pollen	TRG	Neotropic	16	0,56	0,54	Peripheral	Core	57, 58, 61, 97, 141, 146, 159
4	*Epicharis rustica* (Olivier, 1789)	Bees	Centridini	Oil, Pollen	TRG / TMF	Neotropic	9	0,56	0,49	Peripheral	Core	39, 42, 117, 159
4	*Epipona tatua* (Cuv., 1797)	Wasp	-	NA	TRG	Neotropic	4	0,13	0,00	Peripheral	Periphery	159
4	*Exomalopsis fulvofasciata* Smith, 1879	Bees	-	Not available	TRG	Neotropic	2	-0,30	0,00	Peripheral	Periphery	153
4	*Frieseomelitta silvestrii* (Friese, 1902)	Bees	-	Pollen	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	27
4	*Geotrigona mombuca* (Smith, 1863)	Bees	-	Not available	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	153
4	*Geotrigona subterranea* (Friese, 1901)	Bees	-	Not available	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	140
4	*Megachile beroni* Schrottky*	Bees	-	Not available	TRG	Neotropic	6	0,56	0,00	Peripheral	Periphery	159
4	*Megachile rubricata* Smith, 1853	Bees	-	Not available	TRG	Neotropic	3	-0,09	0,00	Peripheral	Periphery	159
4	*Melipona quadrifasciata* Lepeletier, 1836	Bees	-	Pollen	TRG / TMF	Neotropic	3	-0,51	0,67	Connectors	Periphery	93, 103, 138
4	*Melipona quinquefasciata* Lepeletier, 1836	Bees	-	Pollen	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	93
4	*Melipona rufiventris* Lepeletier, 1836	Bees	-	Not available	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	153

4	*Paratetrapedia leucostoma* (Cockerell, 1923)	Bees	Tapinotaspidini	Oil, Pollen	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	27
4	*Paratetrapedia tricolor**	Bees	Tapinotaspidini	Not available	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	140
4	*Paratetrapedia xantopoda**	Bees	Tapinotaspidini	Pollen	TRG	Neotropic	7	0,77	0,00	Peripheral	Periphery	159
4	*Paratrigona lineata* (Lepeletier, 1836)	Bees	-	Oil, Pollen	TRG / TMF	Neotropic	19	1,41	0,54	Peripheral	Core	2, 25, 27, 31, 57, 64, 81, 140, 153, 159, 161
4	*Paroxystoglossa andromache* Schrottky, 1909	Bees	-	Not available	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	138
4	*Plebeia saiqui* (Friese, 1900)	Bees	-	Not available	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	83
4	*Polistes lanio* (Fabricius, 1775)	Wasp	-	NA	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	92
4	*Polybia ignobilis* (Haliday, 1836)	Wasp	-	NA	TRG	Neotropic	8	0,34	0,56	Peripheral	Core	26, 92, 159
4	*Polybia sericea* (Olivier, 1792)	Wasp	-	NA	TRG	Neotropic	4	0,13	0,00	Peripheral	Periphery	92
4	*Pseudaugochlora graminea* (Fabricius, 1804)	Bees	-	Not available	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	140
4	*Pseudopolybia vespicipes**	Wasp	-	NA	TRG	Neotropic	4	0,13	0,00	Peripheral	Periphery	159
4	*Scaptotrigona postica* (Latreille, 1807)	Bees	-	Not available	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	138

4	*Tetragona clavipes* (Fabricius, 1804)	Bees	-	Oil, Pollen	TRG	Neotropic	9	0,77	0,35	Peripheral	Core	146, 159, 161
4	*Tetrapedia rugulosa* Friese, 1899	Bees	Tetrapediini	Oil, Pollen	DXS / TRG / TMF	Neotropic	13	0,77	0,64	Connectors	Core	39, 63, 133, 159
4	*Trigona branneri* Cockerell, 1912	Bees	-	Oil, Pollen	TRG	Neotropic	8	0,77	0,22	Peripheral	Core	31, 159
4	*Trigonisca intermedia* Moure, 1989	Bees	-	Pollen	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	27
4	*Trigonopedia glaberrima* (Friese, 1899)	Bees	Tapinotaspidini	Not available	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	140
5	*Bombus terrestris* (Linnaeus, 1758)	Bees	-	Not available	TBMF	Neotropic	3	-0,09	0,00	Peripheral	Periphery	29, 69, 70
5	*Centris cineraria* Smith, 1854	Bees	Centridini	Not available	MF / TBMF / TEG	Neotropic	2	-0,30	0,00	Peripheral	Periphery	14, 155
5	*Centris nigerrima* (Spinola, 1851)	Bees	Centridini	Oil, Pollen	MF / MGS / TBMF	Neotropic	9	1,20	0,00	Peripheral	Periphery	29, 69, 70, 155, 156
5	*Chalepogenus caeruleus* (Friese, 1906)	Bees	Tapinotaspidini	Oil, Pollen	MGS / TBMF	Neotropic	5	0,34	0,00	Peripheral	Periphery	12, 14, 29, 69, 156
5	*Chalepogenus perimelaena* (Cockerell, 1916)	Bees	Tapinotaspidini	Oil, Pollen	TEG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	156
5	*Megachile semirufa* Sichel, 1867	Bees	-	Not available	TBMF	Neotropic	2	-0,30	0,00	Peripheral	Periphery	29, 69, 70
6	*Centris orellanai* Ruiz, 1940	Bees	Centridini	Oil	MGS	Neotropic	1	-0,51	0,00	Peripheral	Periphery	156
7	*Agelaia pallipes* (Olivier, 1791)	Wasp	-	NA	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	92

7	*Alepidosceles hamata* Moure, 1947	Bees	-	Pollen	FGS	Neotropic	1	-0,51	0,00	Peripheral	Periphery	38
7	*Alepidosceles imitatrix* (Schrottky, 1909)	Bees	-	Pollen	FGS	Neotropic	1	-0,51	0,00	Peripheral	Periphery	38
7	*Augochloropsis callichroa* (Cockerell, 1900)	Bees	-	Pollen	TRG / TMF	Neotropic	4	-0,09	0,38	Peripheral	Periphery	2, 15
7	*Augochloropsis electra* (Smith, 1853)	Bees	-	Not available	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	94
7	*Augochloropsis notophos* (Vachal, 1903)	Bees	-	Not available	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	94
7	*Augochloropsis rotalis* (Vachal, 1903)	Bees	-	Not available	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	94
7	*Augochloropsis sparsilis* (Vachal, 1903)	Bees	-	Not available	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	94
7	*Centris aenea* Lepeletier, 1841	Bees	Centridini	Oil, Pollen	DXS / FGS / TDF / TRG / TMF	Neotropic	31	2,90	0,63	Network hub	Core	2, 4, 5, 9, 10, 19, 26, 27, 34, 35, 38, 40, 47, 48, 59, 61, 64, 65, 68, 74, 78, 87, 88, 89, 94, 97, 98, 101, 104, 108, 133, 135, 136,

7	*Centris caxiensis* Ducke, 1907	Bees	Centridini	Oil, Pollen	DXS / MAN / TRG / TMF	Neotropic	28	1,84	0,52	Peripheral	Core	141, 142, 150, 161 4, 5, 9, 10, 15, 17, 35, 48, 59, 137, 151, 160
7	*Centris decolorata* Lepeletier, 1841	Bees	Centridini	Oil, Pollen	TMF	Neotropic	3	-0,30	0,44	Peripheral	Periphery	27, 78, 99
7	*Centris denudans* Lepeletier, 1841	Bees	Centridini	Oil, Pollen	TRG / TMF	Neotropic	2	-0,51	0,50	Peripheral	Periphery	27, 104, 108
7	*Centris ferruginea* Lepeletier, 1841	Bees	Centridini	Not available	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	94
7	*Centris flavifrons* (Fabricius, 1775)	Bees	Centridini	Oil, Pollen	DXS / FGS / MAN / TEG / TDF / TRG / TMF	Neotropic	27	2,48	0,64	Connectors	Core	4, 5, 9, 15, 27, 35, 38, 54, 59, 78, 88, 91, 97, 98, 99, 104, 108, 129, 131, 135, 138, 141, 147, 153, 160, 161
7	*Centris frontalis**	Bees	Centridini	Oil, Pollen	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	78

7	*Centris fuscata* Lepeletier, 1841	Bees	Centridini	Nectar, Oil, Pollen	DXS / FGS / MAN / TEG / TDF / TRG / TMF	Neotropic	36	3,76	0,58	Module hub	Core	4, 5, 10, 15, 27, 38, 40, 57, 59, 61, 64, 68, 78, 84, 87, 88, 97, 98, 104, 129, 131, 133, 135, 138, 141, 150, 151, 160, 161
7	*Centris leprieuri* (Spinola, 1841)	Bees	Centridini	Oil, Pollen	DXS / TMF	Neotropic	8	0,56	0,41	Peripheral	Periphery	4, 15, 20, 35, 48, 78, 139, 142
7	*Centris longimana* Fabricius, 1804	Bees	Centridini	Oil, Pollen	DXS / MAN / TRG / TMF	Neotropic	12	0,13	0,72	Connectors	Periphery	27, 35, 47, 61, 94, 104, 108, 117, 141, 146, 154, 160
7	*Centris lutea* Friese, 1899	Bees	Centridini	Oil, Pollen	TDF / TRG / TMF	Neotropic	9	-0,09	0,57	Peripheral	Core	15, 17, 61, 131, 141, 146
7	*Centris moerens* (Perty, 1833)	Bees	Centridini	Oil	DXS	Neotropic	2	-0,30	0,00	Peripheral	Core	46, 47, 48
7	*Centris obsolete* Lepeletier, 1841	Bees	Centridini	Oil	DXS / FGS / TRG / TMF	Neotropic	7	-0,09	0,49	Peripheral	Periphery	5, 59, 61, 74, 98, 129, 141
7	*Centris poecila* Lepeletier, 1841	Bees	Centridini	Not available	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	104

7	*Centris pulchra* Moure, Oliveira & Viana, 2003	Bees	Centridini	Oil, Pollen	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	20, 142
7	*Centris rhodoprocta* Moure & Seabra, 1960	Bees	Centridini	Oil, Pollen	DXS / MAN / TDF / TRG / TMF	Neotropic	29	2,26	0,64	Connectors	Periphery	26, 27, 34, 35, 39, 51, 53, 74, 75, 78, 86, 89, 94, 98, 102, 104, 106, 107, 108, 131, 141, 142, 150, 152, 160, 161
7	*Centris rupestris* Azevedo & Silveira, 2005	Bees	Centridini	Not available	TRG	Neotropic	5	-0,30	0,64	Connectors	Core	61
7	*Centris spilopoda* Moure, 1969	Bees	Centridini	Nectar, Oil, Pollen	DXS / FGS / MAN / TRG / TMF	Neotropic	10	0,13	0,74	Connectors	Periphery	9, 17, 27, 38, 47, 64, 78, 87, 97, 104, 108, 135, 141, 142, 144, 160, 161
7	*Centris sponsa* Smith, 1854	Bees	Centridini	Oil, Pollen	DXS / FGS / TRG / TMF	Neotropic	16	0,34	0,63	Connectors	Core	15, 27, 35, 47, 48, 57, 58, 61, 87, 88, 98, 129, 141, 150

7	*Centris tarsata* Smith, 1874	Bees	Centridini	Oil, Pollen	DXS / FGS / MAN / TEG / TRG / TMF	Neotropic	48	3,12	0,70	Network hub	Core	1, 4, 5, 9, 10, 19, 20, 21, 27, 35, 40, 45, 47, 51, 52, 59, 61, 68, 73, 74, 76, 83, 87, 89, 94, 97, 98, 99, 104, 129, 133, 141, 142, 150, 153, 160, 161
7	*Centris terminate* Smith, 1874	Bees	Centridini	Pollen	TMF	Neotropic	3	-0,09	0,00	Peripheral	Core	86
7	*Centris trigonoides* Lepeletier, 1841	Bees	Centridini	Oil, Pollen	DXS / FGS / MAN / TEG / TDF / TRG / TMF	Neotropic	23	1,84	0,63	Connectors	Periphery	5, 15, 20, 26, 27, 40, 59, 61, 68, 98, 117, 128, 129, 131, 133, 141, 142, 160
7	*Centris vittata* Lepeletier, 1841	Bees	Centridini	Oil	TDF / TRG / TMF	Neotropic	4	-0,30	0,63	Connectors	Periphery	51, 104, 131
7	*Epicharis dejeanii* Lepeletier, 1841	Bees	Centridini	Not available	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	94
7	*Epicharis fasciata* Lepeletier & Serville, 1828	Bees	Centridini	Oil, Pollen	TRG / TMF	Neotropic	3	-0,30	0,44	Peripheral	Periphery	78, 87, 94, 97, 141

7	*Epicharis ligulata**	Bees	Centridini	Oil, Pollen	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	78
7	*Epicharis nigrita* Friese, 1900	Bees	Centridini	Oil, Pollen	FGS / TRG / TMF	Neotropic	8	0,56	0,41	Peripheral	Periphery	9, 15, 17, 38, 78, 89 , 141, 148
7	*Epicharis pygialis* (Friese, 1900)	Bees	Centridini	Not available	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	94
7	*Epicharis xanthogastra* Moure & Seabra, 1959	Bees	Centridini	Oil, Pollen	DXS / FGS / TRG	Neotropic	3	-0,09	0,00	Peripheral	Periphery	38, 47, 104
7	*Epicharis zonata* Smith, 1854	Bees	Centridini	Oil, Pollen	FGS	Neotropic	1	-0,51	0,00	Peripheral	Periphery	38
7	*Exomalopsis analis* Spinola, 1853	Bees	-	Pollen	FGS / TRG	Neotropic	3	-0,30	0,44	Peripheral	Periphery	38, 64, 87
7	*Frieseomelitta doederleini* (Friese, 1900)	Bees	-	Not available	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	89
7	*Frieseomelitta varia* (Lepeletier, 1836)	Bees	-	Pollen	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	43
7	*Lophopedia minor* Aguiar, 2009	Bees	Tapinotaspidini	Not available	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	94
7	*Lophopedia pulchra* Aguiar, 2009	Bees	Tapinotaspidini	Not available	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	94
7	*Megachile cylindrica* Friese, 1906	Bees	-	Pollen	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	20
7	*Melipona mondury* Smith, 1863	Bees	-	Not available	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	94
7	*Monoeca luteocincta**	Bees	Tapinotaspidini	Not available	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	97

7	*Monoeca mourei* Aguiar, 2012	Bees	Tapinotaspidini	Oil	DXS / TRG	Neotropic	2	-0,30	0,00	Peripheral	Periphery	47, 48, 87
7	*Nannotrigona testaceicornis* (Lepeletier, 1836)	Bees	-	Not available	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	89
7	*Oxaea flavescens* Klug, 1807	Bees	-	Not available	TRG / TMF	Neotropic	2	-0,51	0,50	Peripheral	Periphery	94, 159
7	*Oxytrigona tataira* (Smith, 1863)	Bees	-	Not available	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	94
7	*Paratetrapedia bicolor* (Smith, 1854)	Bees	Tapinotaspidini	Not available	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	94
7	*Paratetrapedia connexa* (Vachal, 1909)	Bees	Tapinotaspidini	Oil	TRG / TMF	Neotropic	5	-0,30	0,48	Peripheral	Periphery	64, 94, 97, 146, 150
7	*Paratetrapedia maculata* (Friese, 1899)	Bees	Tapinotaspidini	Oil	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	39
7	*Paratetrapedia nigrispinis* (Vachal, 1909)	Bees	Tapinotaspidini	Oil	FGS / TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	129
7	*Paratetrapedia punctata* Aguiar & Melo, 2011	Bees	Tapinotaspidini	Oil, Pollen	DXS / TRG	Neotropic	7	-0,30	0,65	Connectors	Periphery	26, 47, 56, 64, 87
7	*Paratetrapedia pygmaea* (Schrottky, 1902)	Bees	Tapinotaspidini	Oil, Pollen	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	39
7	*Paratetrapedia volatillis* (Smith, 1879)	Bees	Tapinotaspidini	Oil, Pollen	FGS / TMF	Neotropic	2	-0,51	0,50	Peripheral	Periphery	129, 161

7	*Plebeia minima* (Gribodo, 1893)	Bees	-	Pollen	DXS	Neotropic	1	-0,51	0,00	Peripheral	Periphery	4
7	*Polistes canadensis* (Linnaeus, 1758)	Wasp	-	NA	DXS	Neotropic	1	-0,51	0,00	Peripheral	Periphery	92
7	*Polistes simillimus* Zikan, 1951	Wasp	-	NA	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	92
7	*Pseudaugochlora pandora* (Smith, 1853)	Bees	-	Not available	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	87
7	*Tetragonisca fiebrigi* (Schwarz, 1938)	Bees	-	Pollen	FGS	Neotropic	1	-0,51	0,00	Peripheral	Periphery	129
7	*Tetrapedia amplitarsis* Friese, 1899	Bees	Tetrapediini	Oil	DXS / TRG	Neotropic	4	-0,30	0,63	Connectors	Periphery	47, 48, 138
7	*Trigona braueri* Friese, 1900	Bees	-	Not available	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	94
7	*Trigona spinipes* (Fabricius, 1793)	Bees	-	Floral tissue, Oil, Pollen	DXS / FGS / TRG / TMF	Neotropic	39	1,62	0,76	Connectors	Core	4, 9, 15, 19, 25, 26, 31, 38, 56, 57, 59, 64, 71, 74, 76, 79, 84, 87, 88, 89, 93, 94, 99, 103, 118, 129, 133, 138, 146, 161
7	*Tropidopedia nigrocarinata* Aguiar & Melo, 2007	Bees	Tapinotaspidini	Oil	DXS / TRG	Neotropic	5	0,13	0,32	Peripheral	Periphery	47, 48, 57, 87, 97

7	*Urbanapsis diamantina* Aguiar & Melo	Bees	Tapinotaspidini	Oil	DXS	Neotropic	3	-0,09	0,00	Peripheral	Periphery	47, 48
8	*Arhysoceble dichroopoda* Moure, 1948	Bees	Tapinotaspidini	Oil, Pollen	TRG	Neotropic	8	-0,09	0,66	Connectors	Periphery	21, 56, 138, 140
8	*Arhysoceble picta* (Friese, 1899)	Bees	Tapinotaspidini	Oil, Pollen	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	26
8	*Augochlora amphitrite* (Schrottky, 1909)	Bees	-	Pollen	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	76
8	*Augochlora iphigenia* Holmberg, 1886	Bees	-	Pollen	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	26
8	*Augochlora semiramis* (Schrottky, 1910)	Bees	-	Pollen	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	37
8	*Augochlorella ephyra* (Schrottky, 1910)	Bees	-	Pollen	TRG	Neotropic	2	-0,30	0,00	Peripheral	Periphery	26, 76
8	*Augochlorella eusticta* Moure	Bees	-	Pollen	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	76
8	*Augochloropsis cyanea* (Schrottky, 1901)	Bees	-	Pollen	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	56
8	*Augochloropsis euterpe* (Holmberg, 1886)	Bees	-	Not available	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	80
8	*Augochloropsis sympleres* (Vachal, 1903)	Bees	-	Pollen	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	56

8	*Bombus pauloensis* Friese, 1913	Bees	-	Pollen	FGS / TRG	Neotropic	5	-0,30	0,72	Connectors	Periphery	56, 64, 129, 140
8	*Centris vulpecula* Burmeister, 1876	Bees	Centridini	Oil	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	26
8	*Ceratina hyemalis* Moure, 1950	Bees	-	Not available	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	80
8	*Ceratina muelleri* Friese, 1910	Bees	-	Not available	TRG / TMF	Neotropic	2	-0,51	0,50	Peripheral	Periphery	80, 138
8	*Chalepogenus betinae* (Urban, 1995)	Bees	Tapinotaspidini	Not available	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	80
8	*Chalepogenus luciane* (Urban, 1996)	Bees	Tapinotaspidini	Oil, Pollen	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	26
8	*Chalepogenus unicolor* Roig-Alsina, 1999	Bees	Tapinotaspidini	Oil	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	56
8	*Dialictus micheneri* (Moure, 1956)	Bees	-	Pollen	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	56
8	*Dialictus rostratus* (Moure, 1947)	Bees	-	Pollen	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	56
8	*Eristalinus taeniops* Wiedemann, 1818	Fly	-	NA	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	26
8	*Euglossa mandibularis* Friese, 1899	Bees	-	Volatile	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	80
8	*Hexantheda missionica* Ogloblin, 1948	Bees	-	Not available	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	80

8	*Lophopedia nigrispinis* (Vachal, 1909)	Bees	Tapinotaspidini	Oil, Pollen	TRG / TMF	Neotropic	6	0,13	0,50	Peripheral	Periphery	26, 32, 56, 67, 94
8	*Mourella caerulea* (Friese, 1900)	Bees	-	Pollen	TRG	Neotropic	2	-0,51	0,50	Peripheral	Periphery	26, 76
8	*Paratetrapedia iheringii* (Friese, 1899)	Bees	Tapinotaspidini	Oil	TRG	Neotropic	2	-0,51	0,50	Peripheral	Periphery	21
8	*Paroxystoglossa brachycera* Moure, 1960	Bees	-	Not available	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	80
8	*Pirhosigma deforme* (Fox, 1899)	Fly	-	Not available	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	26
8	*Plebeia droryana* (Friese, 1900)	Bees	-	Pollen	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	26
8	*Plebeia emerina* (Friese, 1900)	Bees	-	Pollen	TRG / TMF	Neotropic	2	-0,30	0,00	Peripheral	Periphery	26, 80
8	*Plebeia remota* (Holmberg, 1903)	Bees	-	Not available	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	80
8	*Psaenythia bergii* Holmberg, 1884	Bees	-	Pollen	TRG / TMF	Neotropic	2	-0,30	0,00	Peripheral	Periphery	56, 80
8	*Psaenythia collaris* Schrottky, 1906	Bees	-	Pollen	TRG / TMF	Neotropic	2	-0,30	0,00	Peripheral	Periphery	76, 80
8	*Pseudagapostemon fluminensis* Schrottky, 1911	Bees	-	Not available	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	80
8	*Pseudagapostemon tessellatus* Cure, 1989	Bees	-	Pollen	TRG	Neotropic	2	-0,30	0,00	Peripheral	Periphery	56

8	*Schwarziana quadripunctata* (Lepeletier, 1836)	Bees	-	Not available	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	80
8	*Toxomerus productus* (Curran, 1930)	Fly	-	Not available	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	26
9	*Augochloropsis anisitsi* (Schrottky, 1908)	Bees	-	Pollen	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	56
9	*Augochloropsis aurifluens* (Vachal, 1903)	Bees	-	Pollen	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	13
9	*Augochloropsis illustris* (Vachal, 1903)	Bees	-	Pollen	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	13
9	*Augochloropsis patens* (Vachal, 1903)	Bees	-	Pollen	TRG	Neotropic	2	-0,30	0,00	Peripheral	Periphery	64, 138
9	*Camponotus crassus* Mayr, 1862	Ants	-	Pollen	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	161
9	*Centris bicolor* Lepeletier, 1841	Bees	Centridini	Oil	DXS / FGS / TRG / TMF	Neotropic	16	1,20	0,60	Peripheral	Core	26, 27, 27, 39, 40, 61, 73, 94, 97, 104, 129, 141
9	*Centris collaris* Lepeletier, 1841	Bees	Centridini	Oil, Pollen	TRG / TMF	Neotropic	11	1,41	0,17	Peripheral	Core	39, 40, 57, 118, 141
9	*Centris dentata* Smith, 1854	Bees	Centridini	Oil, Pollen	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	57
9	*Centris dorsata* Lepeletier, 1841	Bees	Centridini	Oil, Pollen	TRG	Neotropic	5	0,34	0,00	Peripheral	Periphery	57, 58, 141

9	*Centris labrosa* Friese, 1899	Bees	Centridini	Oil	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	40
9	*Centris lateritia* Friese, 1899	Bees	Centridini	Not available	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	61
9	*Centris machadoi* Azevedo & Silveira, 2005	Bees	Centridini	Oil, Pollen	TRG	Neotropic	3	-0,30	0,44	Peripheral	Core	57, 58, 61
9	*Centris mocsaryi* Friese, 1899	Bees	Centridini	Oil	TRG / TMF	Neotropic	14	1,84	0,26	Peripheral	Periphery	40, 61, 97, 104, 141
9	*Centris nitens* Lepeletier, 1841	Bees	Centridini	Oil, Pollen	DXS / FGS / TRG / TMF	Neotropic	24	2,05	0,60	Peripheral	Periphery	4, 9, 15, 38, 40, 47, 48, 61, 74, 87, 97, 99, 104, 108, 138, 141
9	*Centris scopipes* Friese, 1899	Bees	Centridini	Oil, Pollen	TRG / TMF	Neotropic	19	2,05	0,48	Peripheral	Periphery	57, 58, 61, 104, 108, 138, 141, 145, 146, 159
9	*Centris similis* (Fabricius, 1804)	Bees	Centridini	Oil	TRG / TMF	Neotropic	3	-0,09	0,00	Peripheral	Core	39, 141
9	*Centris simplex* Friese	Bees	Centridini	Not available	TMF	Neotropic	3	-0,30	0,44	Peripheral	Periphery	51
9	*Centris varia* (Erichson, 1849)	Bees	Centridini	Oil	FGS / TDF / TRG / TMF	Neotropic	18	0,77	0,70	Connectors	Periphery	25, 34, 38, 57, 61, 71, 74, 78, 89, 93, 94, 97, 99, 104, 108, 117, 129,

												131, 138, 141, 153
9	*Centris violacea* Lepeletier, 1841	Bees	Centridini	Oil	TRG	Neotropic	4	-0,09	0,38	Peripheral	Periphery	61, 64, 141
9	*Centris xanthocnemis* Perty, 1833	Bees	Centridini	Not available	TRG	Neotropic	2	-0,51	0,50	Peripheral	Periphery	138, 146
9	*Cephalotes possumus**	Ants	-	Pollen	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	161
9	*Cephalotes pusillus* (Klug, 1824)	Ants	-	Pollen	TRG	Neotropic	3	-0,30	0,44	Peripheral	Periphery	161
9	*Epicharis affinis* Smith, 1874	Bees	Centridini	Oil, Pollen	TRG / TMF	Neotropic	19	1,62	0,57	Peripheral	Core	31, 39, 40, 61, 94, 97, 104, 108, 138, 141, 159
9	*Epicharis albofasciata* Smith, 1874	Bees	Centridini	Pollen	TRG	Neotropic	2	-0,51	0,50	Peripheral	Periphery	108, 138, 141
9	*Epicharis analis* Lepeletier, 1841	Bees	Centridini	Oil, Pollen	DXS / TRG / TMF	Neotropic	23	2,26	0,54	Peripheral	Core	13, 27, 31, 39, 40, 47, 48, 57, 58, 61, 64, 94, 97, 104, 138, 141, 146, 159

9	*Epicharis bicolor* Smith, 1854	Bees	Centridini	Oil, Pollen	DXS / MAN / TRG / TMF	Neotropic	27	1,62	0,69	Connectors	Core	13, 27, 31, 47, 48, 57, 58, 61, 64, 78, 87, 89, 97, 104, 108, 113, 138, 141, 142, 150, 159, 160
9	*Epicharis cockerelli* Friese, 1900	Bees	Centridini	Oil, Pollen	DXS / TRG / TMF	Neotropic	10	0,34	0,62	Connectors	Core	2, 31, 47, 48, 61, 94, 97, 104, 138, 141, 161
9	*Epicharis flava* (Friese, 1900)	Bees	Centridini	Oil, Pollen	FGS / MAN / TRG / TMF	Neotropic	33	3,97	0,49	Module hub	Core	13, 25, 31, 34, 40, 57, 61, 64, 74, 78, 87, 89, 94, 97, 98, 99, 104, 108, 135, 138, 141, 142, 146, 150, 160, 161
9	*Epicharis maculate* Smith, 1874	Bees	Centridini	Oil, Pollen	TMF	Neotropic	4	-0,30	0,63	Connectors	Periphery	74, 78, 117
9	*Epicharis minima* (Friese, 1904)	Bees	Centridini	Not available	TRG	Neotropic	2	-0,51	0,50	Peripheral	Periphery	61, 97, 141
9	*Epicharis morio* Friese, 1924	Bees	Centridini	Not available	TRG	Neotropic	5	-0,09	0,56	Peripheral	Periphery	61

9	*Epicharis obscura* Friese, 1899	Bees	Centridini	Oil	TMF	Neotropic	5	-0,09	0,48	Peripheral	Periphery	39, 40, 94
9	*Epicharis picta* (Smith, 1874)	Bees	Centridini	Oil, Pollen	TRG / TMF	Neotropic	9	0,34	0,57	Peripheral	Core	97, 138, 141, 159
9	*Epicharis semiflava* Moure*	Bees	Centridini	Not available	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	97
9	*Eulaema nigrita* Lepeletier, 1841	Bees	-	Pollen	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	64
9	*Exomalopsis auropilosa* Spinola, 1853	Bees	-	Not available	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	58
9	*Exomalopsis fulvofasciculata* Smith, 1879	Bees	-	Pollen	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	64
9	*Friesella schrottkyi* (Friese, 1900)	Bees	-	Not available	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	138
9	*Leurotrigona muelleri* (Friese, 1900)	Bees	-	Oil, Pollen	TRG	Neotropic	6	0,34	0,28	Peripheral	Periphery	161
9	*Lophopedia pygmaea* (Schrottky, 1902)	Bees	Tapinotaspidini	Oil, Pollen	TRG / TMF	Neotropic	6	0,13	0,44	Peripheral	Periphery	57, 74, 94, 97
9	*Monoeca brasiliensis* Lepeletier & Audinet-Serville, 1828	Bees	Tapinotaspidini	Oil, Pollen	TRG / TMF	Neotropic	4	-0,30	0,50	Peripheral	Periphery	34, 57, 94
9	*Monoeca haemorrhoidalis* (Smith, 1854)	Bees	Tapinotaspidini	Oil, Pollen	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	114
9	*Monoeca lanei* (Moure, 1944)	Bees	Tapinotaspidini	Oil, Pollen	TRG	Neotropic	2	-0,51	0,50	Peripheral	Periphery	161

9	*Monoeca pluricincta* (Vachal, 1909)	Bees	Tapinotaspidini	Not available	TRG	Neotropic	5	0,34	0,00	Peripheral	Periphery	61
9	*Ornidia obesa* Fabricius, 1775	Fly	-	Pollen	TMF	Neotropic	2	-0,51	0,50	Peripheral	Periphery	9, 161
9	*Paratetrapedia flaveola* Aguiar & Melo, 2011	Bees	Tapinotaspidini	Oil, Pollen	TRG	Neotropic	2	-0,30	0,00	Peripheral	Periphery	161
9	*Paratetrapedia lineata* (Spinola, 1851)	Bees	Tapinotaspidini	Not available	TRG	Neotropic	2	-0,30	0,00	Peripheral	Periphery	97
9	*Paratetrapedia velutina* (Friese, 1910)	Bees	Tapinotaspidini	Oil, Pollen	TMF	Neotropic	2	-0,30	0,00	Peripheral	Periphery	40
9	*Paratrigona subnuda* Moure, 1947	Bees	-	Oil, Pollen	TRG	Neotropic	3	-0,09	0,00	Peripheral	Periphery	161
9	*Pheidole gertrudae* Forel, 1886	Ants	-	Oil, Pollen	TRG	Neotropic	5	0,13	0,32	Peripheral	Periphery	161
9	*Polybia paulista* Ihering, 1896	Wasp	-	Not available	TRG	Neotropic	2	-0,51	0,50	Peripheral	Periphery	92
9	*Pseudomyrmex gracilis* (Fabricius, 1804)	Ants	-	Pollen	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	161
9	*Scaptotrigona tubiba* (Smith, 1863)	Bees	-	Pollen	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	64
9	*Tetrapedia curvitarsis* Friese, 1899	Bees	Tetrapediini	Oil, Pollen	TRG / TMF	Neotropic	6	0,34	0,28	Peripheral	Periphery	8, 57, 63, 138
9	*Tetrapedia diversipes* Klug, 1810	Bees	Tetrapediini	Oil, Pollen	DXS / MAN / TRG / TMF	Neotropic	23	2,26	0,59	Peripheral	Core	8, 9, 27, 31, 32, 40, 44, 47, 51, 57, 58, 63, 74,

												87, 89, 97, 138, 160
9	*Tetrapedia imitatrix* Moure, 1999	Bees	Tetrapediini	Oil, Pollen	TRG	Neotropic	4	-0,09	0,38	Peripheral	Periphery	25, 161
9	*Tetrapedia peckoltii* Friese, 1899	Bees	Tetrapediini	Oil	TRG / TMF	Neotropic	9	0,98	0,20	Peripheral	Periphery	8, 26, 51
9	*Trigona recursa* Smith, 1863	Bees	-	Oil, Pollen	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	161
9	*Tropidopedia carinata* Aguiar & Melo, 2007	Bees	Tapinotaspidini	Oil	TRG	Neotropic	2	-0,30	0,00	Peripheral	Periphery	57, 58
9	*Tropidopedia flavolineata* Aguiar & Melo, 2007	Bees	Tapinotaspidini	Oil	TRG	Neotropic	3	-0,09	0,00	Peripheral	Periphery	57, 58, 64
9	*Tropidopedia punctifrons* (Smith, 1879)	Bees	Tapinotaspidini	Oil	TRG	Neotropic	3	-0,09	0,00	Peripheral	Periphery	57, 58, 64
9	*Xanthopedia iheringii* (Friese, 1899)	Bees	Tapinotaspidini	Oil, Pollen	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	56
9	*Xanthopedia larocai* Moure, 1995	Bees	Tapinotaspidini	Oil, Pollen	FGS / TRG / TMF	Neotropic	5	-0,30	0,72	Connectors	Periphery	9, 25, 31, 38, 97
9	*Xylocopa grisescens* Lepeletier, 1841	Bees	-	Pollen	DXS / TMF	Neotropic	2	-0,51	0,50	Peripheral	Periphery	5, 59, 100
9	*Xylocopa hirsutissima* Maidl, 1912	Bees	-	Oil	TRG	Neotropic	2	-0,30	0,00	Peripheral	Periphery	64
9	*Xylocopa macrops* Lepeletier, 1841	Bees	-	Not available	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	138
10	*Heterochelus podagricus* Fabricius, 1781	Beatle	-	Pollen	MF	Paleotropic	1	-0,51	0,00	Peripheral	Periphery	121

10	*Lepithrix hilaris* Péringuey, 1902	Beatle	-	Not available	MF	Paleotropic	1	-0,51	0,00	Peripheral	Periphery	121
11	*Anthrenoides meridionalis* (Schrottky, 1906)	Bees	-	Pollen	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	76
11	*Anthrenoides micans* Urban, 1995	Bees	-	Pollen	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	76
11	*Astylus quadrilineatus* (Germar, 1825)	Beatle	-	Floral tissue	TEG	Neotropic	2	-0,30	0,00	Peripheral	Periphery	16
11	*Augochlorodes clementis* Gonçalves & Melo, 2008	Bees	-	Pollen	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	76
11	*Chalepogenus goeldianus* (Friese, 1899)	Bees	Tapinotaspidini	Oil, Pollen	MGS / TRG	Neotropic	3	-0,09	0,00	Peripheral	Periphery	12, 76
11	*Chalepogenus muelleri* (Friese, 1899)	Bees	Tapinotaspidini	Pollen	TRG	Neotropic	4	0,13	0,00	Peripheral	Periphery	76
11	*Chalepogenus roitmani* Roig-Alsina, 1999	Bees	Tapinotaspidini	Oil, Pollen	TEG	Neotropic	2	-0,30	0,00	Peripheral	Periphery	16
11	*Chauliognathus scriptus* (Germar, 1824)	Beatle	-	Not available	TEG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	16
11	*Lanthanomelissa clementis* Urban, 1996	Bees	Tapinotaspidini	Oil, Pollen	TRG	Neotropic	2	-0,30	0,00	Peripheral	Periphery	76
11	*Lanthanomelissa discrepans* Holmberg, 1903	Bees	Tapinotaspidini	Oil, Pollen	TRG / TMF	Neotropic	5	0,34	0,00	Peripheral	Periphery	12, 76

11	*Lanthanomelissa magaliae* Urban, 1996	Bees	Tapinotaspidini	Not available	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	12
11	*Lanthanomelissa pampicola* Urban, 1995	Bees	Tapinotaspidini	Pollen	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	76
11	*Paratetrapedia melampoda* Moure, 1948	Bees	Tapinotaspidini	Pollen	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	76
11	*Polybia platycephala* Richards, 1951	Wasp	-	Not available	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	92
11	*Rhophitulus guariticola* (Schlindwein & Moure, 1998)	Bees	-	Pollen	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	76
11	*Rhophitulus holostictus* (Schlindwein & Moure, 1998)	Bees	-	Pollen	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	76
12	*Macropis fulvipes* (Fabricius, 1804)	Bees	Melittinae	Oil, Pollen	TBMF	Paleartic	1	-0,51	0,00	Peripheral	Periphery	157
13	*Macropis nuda* (Provancher, 1882)	Bees	Melittinae	Oil, Pollen	TBMF	Neartic	1	-0,51	0,00	Peripheral	Periphery	7
14	*Paratetrapedia fervida* (Smith, 1879)	Bees	Tapinotaspidini	Oil, Pollinaria	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	28
15	*Arhysoceble huberi* (Ducke, 1908)	Bees	Tapinotaspidini	Oil, Pollen	DXS / TRG / TMF	Neotropic	3	-0,09	0,00	Peripheral	Periphery	9, 10, 26
15	*Caenonomada bruneri* Ashmead, 1899	Bees	Tapinotaspidini	Oil, Pollen	TRG	Neotropic	5	-0,09	0,56	Peripheral	Periphery	1, 26, 76, 161

15	*Caenonomada unicalcarata* (Ducke, 1908)	Bees	Tapinotaspidini	Oil, Pollen	DXS / FGS / TRG	Neotropic	5	0,34	0,00	Peripheral	Periphery	1, 10, 26
15	*Centris hyptidis* Ducke, 1908	Bees	Centridini	Oil, Pollen	DXS / TRG / TMF	Neotropic	4	0,13	0,00	Peripheral	Periphery	9, 10, 23, 26, 133, 142
15	*Centris hyptidoides* Roig-Alsina, 2000	Bees	Centridini	Oil	FGS / TRG	Neotropic	3	-0,09	0,00	Peripheral	Periphery	10, 26
15	*Centris thelyopsis* Vivallo & Melo, 2009	Bees	Centridini	Oil	TRG	Neotropic	2	-0,30	0,00	Peripheral	Periphery	26
15	*Centris xanthomelaena* Moure & Castro, 2001	Bees	Centridini	Oil	DXS / TDF	Neotropic	3	-0,30	0,44	Peripheral	Periphery	10, 133
15	*Ceratina maculifrons* Smith, 1854	Bees	-	Pollen	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	9
15	*Euglossa annectens* Dressier, 1982	Bees	-	Not available	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	49
15	*Nannotrigona punctate* (Smith, 1854)	Bees	-	Not available	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	9
15	*Paratetrapedia huberi**	Bees	Tapinotaspidini	Oil, Pollen	DXS	Neotropic	2	-0,51	0,50	Peripheral	Periphery	133
15	*Plebeia mosquito* (Smith, 1863)	Bees	-	Pollen	DXS	Neotropic	1	-0,51	0,00	Peripheral	Periphery	133
15	*Tapinotaspis nordestina* Roig-Alsina, 2003	Bees	Tapinotaspidini	Oil	DXS	Neotropic	1	-0,51	0,00	Peripheral	Periphery	26
15	*Tapinotaspoides serraticornis* (Friese, 1899)	Bees	Tapinotaspidini	Oil	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	10

16	*Psaenythia annulata* Gerstaecker, 1868	Bees	-	Pollen	TRG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	56
17	*Rediviva gigas* Whitehead & Steiner, 1993	Bees	Melittinae	Oil, Pollen	MF	Paleotropic	2	-0,30	0,00	Peripheral	Periphery	125
18	*Patellapis doleritica* Timmermann, 2009	Bees	-	Pollen	DXS	Paleotropic	2	-0,30	0,00	Peripheral	Periphery	22
18	*Rediviva albifasciata* Whitehead & Steiner, 1994	Bees	Melittinae	Oil, Pollen	DXS / MF	Paleotropic	2	-0,30	0,00	Peripheral	Periphery	105, 126
18	*Rediviva bicava* Whitehead & Steiner, 2001	Bees	Melittinae	Oil	DXS / MF	Paleotropic	2	-0,30	0,00	Peripheral	Periphery	33, 105, 126
18	*Rediviva intermixta* (Cockerell, 1934)	Bees	Melittinae	Oil, Pollen	DXS / MF	Paleotropic	4	0,13	0,00	Peripheral	Periphery	22, 33, 55, 105
18	*Rediviva longimanus* Michener, 1981	Bees	Melittinae	Not available	DXS	Paleotropic	2	-0,30	0,00	Peripheral	Periphery	22
18	*Rediviva macgregori* Whitehead & Steiner, 2001	Bees	Melittinae	Not available	DXS	Paleotropic	2	-0,30	0,00	Peripheral	Periphery	22
18	*Rediviva nitida* Whitehead & Steiner, 2001	Bees	Melittinae	Not available	DXS	Paleotropic	2	-0,30	0,00	Peripheral	Periphery	22
18	*Rediviva parva* Whitehead & Steiner, 2001	Bees	Melittinae	Oil	MF	Paleotropic	2	-0,30	0,00	Peripheral	Periphery	33, 105

18	*Rediviva peringueyi* (Friese, 1911)	Bees	Melittinae	Oil	MF	Paleotropic	6	0,56	0,00	Peripheral	Periphery	33, 105
19	*Rediviva micheneri* Whitehead & Steiner, 2001	Bees	Melittinae	Not available	MF	Paleotropic	1	-0,51	0,00	Peripheral	Periphery	33
20	*Rediviva brunnea* Whitehead & Steiner, 2008	Bees	Melittinae	Oil, Pollen	MGS	Paleotropic	4	0,13	0,00	Peripheral	Periphery	122
20	*Rediviva colorata* Michener, 1981	Bees	Melittinae	Oil	MGS	Paleotropic	2	-0,30	0,00	Peripheral	Periphery	122
20	*Rediviva neliana* Cockerell, 1931	Bees	Melittinae	Oil, Pollen	DXS / MF / MGS	Paleotropic	16	2,69	0,00	Module hub	Core	119, 122, 123
20	*Rediviva pallidula* Whitehead & Steiner, 1992	Bees	Melittinae	Not available	MF / MGS	Paleotropic	3	-0,09	0,00	Peripheral	Periphery	124
21	*Rediviva rufocincta* (Cockerell, 1934)	Bees	Melittinae	Not available	MGS	Paleotropic	2	-0,30	0,00	Peripheral	Periphery	124
22	*Bombus opifex* Smith, 1879	Bees	-	Pollen	MGS / TDF	Neotropic	3	-0,09	0,00	Peripheral	Periphery	18, 155, 156
22	*Centris brethesi* Schrottky, 1902	Bees	Centridini	Nectar, Oil, Pollen	MGS / TEG / TDF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	18, 41, 77, 155
22	*Centris flavohirta* Friese, 1899	Bees	Centridini	Oil, Pollen	TBMF / TMF	Neotropic	3	-0,30	0,44	Peripheral	Periphery	156
22	*Centris geminate* Cockerell, 1914	Bees	Centridini	Oil	TEG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	11
22	*Centris rhodophthalma* Pérez, 1911	Bees	Centridini	Not available	TDF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	155

22	*Centris tricolor* Friese, 1899	Bees	Centridini	Nectar, Oil, Pollen	FGS / MGS / TEG / TDF / TRG	Neotropic	9	0,77	0,37	Peripheral	Periphery	11, 18, 30, 50, 76, 129, 155, 156
22	*Centris vardyorum* Roig-Alsina, 2000	Bees	Centridini	Oil, Pollen	MGS / TEG / TDF	Neotropic	1	-0,51	0,00	Peripheral	Core	18, 77
22	*Chalepogenus brevipili**	Bees	Tapinotaspidini	Not available	TDF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	50
22	*Chalepogenus nigripes* (Friese, 1899)	Bees	Tapinotaspidini	Oil	TDF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	30, 50
22	*Chalepogenus parvus* Roig-Alsina, 1997	Bees	Tapinotaspidini	Oil	TDF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	30, 50
22	*Chalepogenus rufipes* Roig-Alsina, 1999	Bees	Tapinotaspidini	Oil, Pollen	MGS / TMF	Neotropic	4	0,13	0,00	Peripheral	Periphery	156
22	*Chalepogenus vogeli* Roig-Alsina,1999	Bees	Tapinotaspidini	Oil, Pollen	MGS / TMF	Neotropic	3	-0,09	0,00	Peripheral	Periphery	156
22	*Eupeprina nuda**	Bees	-	Not available	MGS	Neotropic	1	-0,51	0,00	Peripheral	Periphery	18
22	*Lanthanomelissa goeldiana**	Bees	Tapinotaspidini	Oil	TEG / TDF	Neotropic	2	-0,30	0,00	Peripheral	Periphery	11
22	*Mesonychium jenseni* (Friese, 1906)	Bees	-	Not available	TEG	Neotropic	1	-0,51	0,00	Peripheral	Periphery	77
22	*Tapinotaspis chalybaea* (Friese, 1899)	Bees	Tapinotaspidini	Oil, Pollen	TEG / TDF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	11, 30, 50
22	*Xylocopa ordinaria* Smith, 1874	Bees	-	Pollen	MGS / TEG / TDF	Neotropic	3	-0,51	0,44	Peripheral	Periphery	18, 25, 71
23	*Thinocorus rumicivorus* Eschscholtz, 1829	Birds	-	Not available	TBMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	156

24	*Augochloropsis crassigena* Moure, 1943	Bees	-	Pollen	MAN	Neotropic	1	-0,51	0,00	Peripheral	Periphery	160
24	*Augochloropsis metallica* (Fabricius, 1793)	Bees	-	Pollen	TBMF	Neartic	1	-0,51	0,00	Peripheral	Periphery	82
24	*Bungalotis midas* Cramer, 1775	Butterflie	-	Not available	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	42
24	*Centris adanae* Cockerell, 1949	Bees	Centridini	Oil	TDF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	131
24	*Centris aethiocesta* Snelling, 1984	Bees	Centridini	Oil	TDF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	131
24	*Centris aethyctera* Snelling, 1974	Bees	Centridini	Oil	TDF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	131
24	*Centris bicornuta* Mocsáry, 1899	Bees	Centridini	Oil	TDF / TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	117, 131
24	*Centris byrsonimae* Mahlmann & Oliveira, 2012	Bees	Centridini	Oil, Pollen	DXS / MAN / TMF	Neotropic	3	-0,30	0,44	Peripheral	Periphery	10, 35, 160
24	*Centris dichrootricha* (Moure, 1945)	Bees	Centridini	Oil, Pollen	TRG	Neotropic	3	-0,09	0,00	Peripheral	Periphery	62
24	*Centris errans* Fox, 1899	Bees	Centridini	Not available	TBMF	Neartic	1	-0,51	0,00	Peripheral	Periphery	82
24	*Centris flavofasciata* Friese, 1899	Bees	Centridini	Oil	TDF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	131
24	*Centris heithausei**	Bees	Centridini	Oil	TDF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	131
24	*Centris maranhensis* Ducke, 1910	Bees	Centridini	Oil	TMF	Neotropic	2	-0,51	0,50	Peripheral	Periphery	27

24	*Centris nitida* Smith, 1874	Bees	Centridini	Oil	TBMF / TDF	Neartic / Neotropic	2	-0,30	0,00	Peripheral	Core	82, 85, 131
24	*Cephalotrigona capitata* (Smith, 1854)	Bees	-	Not available	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	117
24	*Ceratina chloris* (Fabricius, 1804)	Bees	-	Pollen	TMF	Neotropic	2	-0,51	0,50	Peripheral	Periphery	42, 94
24	*Ceratina glossata* Michener, 1954	Bees	-	Pollen	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	42
24	*Dicranthidium arenarium* (Ducke, 1907)	Bees	-	Not available	MAN	Neotropic	1	-0,51	0,00	Peripheral	Periphery	160
24	*Dyscophellus nicephorus* Hewitson 1876	Butterflie	-	Not available	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	42
24	*Dyscophellus phraxanor* Hewitson 1876	Butterflie	-	Not available	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	42
24	*Epicharis metatarsalis* Friese, 1899	Bees	Centridini	Oil, Pollen	TMF	Neotropic	2	-0,30	0,00	Peripheral	Periphery	127
24	*Epicharis monozona* Mocsáry, 1898	Bees	Centridini	Not available	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	42
24	*Epicharis umbraculata* (Fabricius, 1804)	Bees	Centridini	Not available	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	35
24	*Eufriesea surinamensis* (Linnaeus, 1758)	Bees	-	Not available	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	42
24	*Euglossa allosticta* Moure, 1969	Bees	-	Not available	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	42

24	*Euglossa bursigera* Moure, 1970	Bees	-	Not available	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	42
24	*Euglossa dissimula* Dressler, 1978	Bees	-	Not available	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	42
24	*Euglossa igniventris* Friese, 1925	Bees	-	Not available	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	42
24	*Euglossa imperialis* Cockerell, 1922	Bees	-	Pollen	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	6
24	*Euglossa townsendi* Cockerell, 1904	Bees	-	Not available	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	42
24	*Euglossa tridentate* Moure, 1970	Bees	-	Nectar, Pollen	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	6, 42
24	*Euglossa variabilis* Friese, 1899	Bees	-	Not available	TMF	Neotropic	2	-0,30	0,00	Peripheral	Periphery	42
24	*Eulaema cingulate* (Fabricius, 1804)	Bees	-	Not available	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	42
24	*Eulaema meriana* (Olivier, 1789)	Bees	-	Not available	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	42
24	*Exaerete frontalis* (Guérin-Méneville, 1845)	Bees	-	Not available	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	42
24	*Frieseomelitta flavicornis* (Fabricius, 1798)	Bees	-	Pollen	TMF	Neotropic	2	-0,51	0,50	Peripheral	Periphery	27
24	*Frieseomelitta nigra* (Cresson, 1878)	Bees	-	Oil, Pollen	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	117
24	*Megalopta amoena* (Spinola, 1853)	Bees	-	Pollen	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	100

24	*Melipona flavolineata* Friese, 1900	Bees	-	Not available	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	35
24	*Melipona subnitida* Ducke, 1910	Bees	-	Pollen	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	100
24	*Paratetrapedia calcarata* (Cresson, 1878)	Bees	Tapinotaspidini	Nectar, Oil, Pollen	TMF	Neotropic	2	-0,30	0,00	Peripheral	Periphery	6, 154
24	*Paratetrapedia globulosa* (Friese, 1899)	Bees	Tapinotaspidini	Not available	TRG / TMF	Neotropic	2	-0,51	0,50	Peripheral	Periphery	35, 137
24	*Paratetrapedia lugubris* (Cresson, 1878)	Bees	Tapinotaspidini	Not available	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	154
24	*Paratetrapedia moesta* (Cresson, 1878)	Bees	Tapinotaspidini	Oil	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	117
24	*Paratetrapedia nasuta**	Bees	Tapinotaspidini	Oil	MAN	Neotropic	1	-0,51	0,00	Peripheral	Periphery	160
24	*Paratetrapedia tarsalis**	Bees	Tapinotaspidini	Oil	MAN	Neotropic	1	-0,51	0,00	Peripheral	Periphery	160
24	*Paratetrapedia testacea* (Smith, 1854)	Bees	Tapinotaspidini	Oil, Pollen	MAN / TMF	Neotropic	3	-0,51	0,67	Connectors	Periphery	13, 27, 160
24	*Paratetrapedia xanthaspis* (Cockerell, 1929)	Bees	Tapinotaspidini	Not available	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	154
24	*Partamona cupira* (Smith, 1863)	Bees	-	Not available	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	6
24	*Tetragona dorsalis* (Smith, 1854)	Bees	-	Not available	MAN	Neotropic	1	-0,51	0,00	Peripheral	Periphery	160

24	*Tetragona quadrangula* (Lepeletier, 1836)	Bees	-	Pollen	TMF	Neotropic	2	-0,51	0,50	Peripheral	Periphery	27
24	*Tetragonisca angustula* (Latreille, 1825)	Bees	-	Pollen	FGS / TDF / TRG / TMF	Neotropic	10	-0,30	0,74	Connectors	Core	2, 6, 25, 27, 38, 85, 94, 103, 117, 153
24	*Tetrapedia maura* Cresson, 1878	Bees	Tetrapediini	Oil	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	117
24	*Trigona corvina* Cockerell, 1913	Bees	-	Oil	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	117
24	*Trigona fulviventris* Guérin-Méneville, 1845	Bees	-	Oil, Pollen	MAN / TDF / TMF	Neotropic	7	0,13	0,61	Peripheral	Periphery	9, 27, 35, 78, 85, 117, 154, 160
24	*Trigona fuscipennis* Friese, 1900	Bees	-	Oil, Pollen	MAN / TMF	Neotropic	5	-0,09	0,56	Peripheral	Periphery	9, 27, 35, 78, 85, 94, 117, 154, 160
24	*Trigona muzoensis* Schwarz, 1948	Bees	-	Oil	TMF	Neotropic	2	-0,30	0,00	Peripheral	Periphery	117
24	*Trigona pallens* (Fabricius, 1798)	Bees	-	Oil, Pollen	MAN / TMF	Neotropic	6	0,34	0,28	Peripheral	Periphery	6, 27, 42, 154, 160
24	*Trigonisca extrema* Albuquerque & Camargo, 2007	Bees	-	Not available	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	35
24	*Xanthopedia globulosa* (Friese, 1899)	Bees	Tapinotaspidini	Oil, Pollen	TRG / TMF	Neotropic	2	-0,51	0,50	Peripheral	Periphery	10, 27
24	*Xylocopa cearensis* Ducke, 1911	Bees	-	Pollen	DXS / TMF	Neotropic	3	-0,30	0,44	Peripheral	Periphery	35, 88, 100

25	*Centris lanipes* (Fabricius, 1775)	Bees	Centridini	Not available	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	147
25	*Centris versicolor* (Fabricius, 1775)	Bees	Centridini	Not available	TMF	Neotropic	1	-0,51	0,00	Peripheral	Core	147
25	*Melipona fasciata* Latreille, 1811	Bees	-	Not available	TMF	Neotropic	1	-0,51	0,00	Peripheral	Periphery	147
25	*Xylocopa frontalis* (Olivier, 1789)	Bees	-	Pollen	DXS / FGS / TRG / TMF	Neotropic	5	-0,30	0,64	Connectors	Periphery	19, 35, 129, 143, 147

Appendix 3: Interactions between oil-producing flowers and floral visitors

Plant Species	Floral visitors species	Floral visitors group
CALCEOLARIACEAE		
Calceolaria arachnoidea Graham	*Bombus terrestris* (Linnaeus, 1758)	Non-oil-collecting bees
	Centris nigerrima (Spinola, 1851)	Centridini bees
	Megachile semirufa Sichel, 1867	Non-oil-collecting bees
Calceolaria biflora Lam.	*Megachile semirufa* Sichel, 1867	Non-oil-collecting bees
Calceolaria corymbosa Ruiz & Pav.	*Centris nigerrima* (Spinola, 1851)	Centridini bees
	Chalepogenus caeruleus (Friese, 1906)	Tapinotaspidini bees
Calceolaria crenatiflora Cav.	*Bombus terrestris* (Linnaeus, 1758)	Non-oil-collecting bees
Calceolaria filicaulis Clos	*Bombus terrestris* (Linnaeus, 1758)	Non-oil-collecting bees
	Centris nigerrima (Spinola, 1851)	Centridini bees
	Chalepogenus caeruleus (Friese, 1906)	Tapinotaspidini bees
	Chalepogenus perimelaena (Cockerell, 1916)	Tapinotaspidini bees
Calceolaria hypericina Poepp. Ex Benth.	*Centris orellanai* Ruiz, 1940	Centridini bees
Calceolaria latifolia Benth.	*Centris nigerrima* (Spinola, 1851)	Centridini bees
Calceolaria paralia Cav.	*Centris nigerrima* (Spinola, 1851)	Centridini bees
Calceolaria parviflora Gillies ex Benth.	*Centris tricolor* Friese, 1899	Centridini bees
Calceolaria pinifolia Cav.	*Centris tricolor* Friese, 1899	Centridini bees
Calceolaria plectranthifolia Walp.	*Centris flavohirta* Friese, 1899	Centridini bees
Calceolaria polifolia Hook.	*Centris nigerrima* (Spinola, 1851)	Centridini bees
Calceolaria polyclada Kraenzl.	*Chalepogenus rufipes* Roig-Alsina, 1999	Tapinotaspidini bees
	Chalepogenus vogeli Roig-Alsina,1999	Tapinotaspidini bees
Calceolaria polyrhiza Cav.	*Centris cineraria* Smith, 1854	Centridini bees
	Centris flavohirta Friese, 1899	Centridini bees
	Chalepogenus caeruleus (Friese, 1906)	Tapinotaspidini bees
Calceolaria purpurea Graham	*Centris nigerrima* (Spinola, 1851)	Centridini bees
Calceolaria schickendantziana Kraenzl.	*Centris flavohirta* Friese, 1899	Centridini bees
	Chalepogenus rufipes Roig-Alsina, 1999	Tapinotaspidini bees
	Chalepogenus vogeli Roig-Alsina,1999	Tapinotaspidini bees
Calceolaria teucrioides Griseb.	*Bombus opifex* Smith, 1879	Non-oil-collecting bees
	Centris tricolor Friese, 1899	Centridini bees
	Chalepogenus rufipes Roig-Alsina, 1999	Tapinotaspidini bees
	Chalepogenus vogeli Roig-Alsina,1999	Tapinotaspidini bees
Calceolaria thyrsiflora Graham	*Centris nigerrima* (Spinola, 1851)	Centridini bees
Calceolaria umbellata Wedd.	*Chalepogenus rufipes* Roig-Alsina, 1999	Tapinotaspidini bees
Calceolaria uniflora Lam.	*Thinocorus rumicivorus* Eschscholtz, 1829	Birds
Calceolaria valdiviana Phil.	*Chalepogenus caeruleus* (Friese, 1906)	Tapinotaspidini bees

GESNERIACEAE		
Drymonia serrulata (Jacq.) Mart.	*Ceratina chloris* (Fabricius, 1804)	Non-oil-collecting bees
	Ceratina glossata Michener, 1954	Non-oil-collecting bees
	Epicharis monozona Mocsáry, 1898	Centridini bees
	Epicharis rustica (Olivier, 1789)	Centridini bees
	Eufriesea surinamensis (Linnaeus, 1758)	Non-oil-collecting bees
	Euglossa allosticta Moure, 1969	Non-oil-collecting bees
	Euglossa bursigera Moure, 1970	Non-oil-collecting bees
	Euglossa dissimula Dressler, 1978	Non-oil-collecting bees
	Euglossa igniventris Friese, 1925	Non-oil-collecting bees
	Euglossa townsendi Cockerell, 1904	Non-oil-collecting bees
	Euglossa tridentata Moure, 1970	Non-oil-collecting bees
	Euglossa variabilis Friese, 1899	Non-oil-collecting bees
	Eulaema cingulata (Fabricius, 1804)	Non-oil-collecting bees
	Eulaema meriana (Olivier, 1789)	Non-oil-collecting bees
	Exaerete frontalis (Guérin-Méneville, 1845)	Non-oil-collecting bees
	Trigona pallens (Fabricius, 1798)	Non-oil-collecting bees
	Bungalotis midas Cramer, 1775	Butterflie
	Dyscophellus nicephorus Hewitson 1876	Butterflie
	Dyscophellus phraxanor Hewitson 1876	Butterflie
IRIDACEAE		
Calydorea crocoides Ravenna	*Brachygastra lecheguana* (Latreille, 1824)	Wasp
Cipura paludosa Aubl.	*Augochlora thalia* Smith, 1879	Non-oil-collecting bees
Cypella fucata Ravenna	*Chalepogenus muelleri* (Friese, 1899)	Tapinotaspidini bees
Cypella herbertii Hook.	*Astylus quadrilineatus* (Germar, 1825)	Beatle
	Chauliognathus scriptus (Germar, 1824)	Beatle
	Caenonomada bruneri Ashmead, 1899	Tapinotaspidini bees
	Chalepogenus muelleri (Friese, 1899)	Tapinotaspidini bees
	Chalepogenus roitmani Roig-Alsina, 1999	Tapinotaspidini bees
	Polybia platycephala Richards, 1951	Wasp
Gelasine coerulea (Vell.) Ravena	*Augochloropsis cyanea* (Schrottky, 1901)	Non-oil-collecting bees

	Bombus pauloensis Friese, 1913	Non-oil-collecting bees
	Pseudagapostemon tessellatus Cure, 1989	Non-oil-collecting bees
	Trigona spinipes (Fabricius, 1793)	Non-oil-collecting bees
Herbertia lahue (Molina) Goldblatt	*Astylus quadrilineatus* (Germar, 1825)	Beatle
	Apis mellifera Linnaeus, 1758	Non-oil-collecting bees
	Chalepogenus goeldianus (Friese, 1899)	Tapinotaspidini bees
	Chalepogenus muelleri (Friese, 1899)	Tapinotaspidini bees
Herbertia pulchella Sweet	*Augochlorella eusticta* Moure	Non-oil-collecting bees
	Psaenythia collaris Schrottky, 1906	Non-oil-collecting bees
	Trigona spinipes (Fabricius, 1793)	Non-oil-collecting bees
Kelissa brasiliensis (Baker) Ravenna	*Augochlora amphitrite* (Schrottky, 1909)	Non-oil-collecting bees
	Augochlorella ephyra (Schrottky, 1910)	Non-oil-collecting bees
Sisyrinchium arenarium Poepp.	*Chalepogenus caeruleus* (Friese, 1906)	Tapinotaspidini bees
Sisyrinchium brasiliense (Ravenna) Ravenna	*Augochloropsis cognata* Moure, 1944	Non-oil-collecting bees
	Trigona spinipes (Fabricius, 1793)	Non-oil-collecting bees
Sisyrinchium chilense Hook.	*Lanthanomelissa discrepans* Holmberg, 1903	Tapinotaspidini bees
Sisyrinchium fasciculatum Klatt	*Lanthanomelissa clementis* Urban, 1996	Tapinotaspidini bees
Sisyrinchium laxum Otto ex Sims	*Chalepogenus goeldianus* (Friese, 1899)	Tapinotaspidini bees
	Lanthanomelissa discrepans Holmberg, 1903	Tapinotaspidini bees
Sisyrinchium micranthum Cav.	*Anthrenoides meridionalis* (Schrottky, 1906)	Non-oil-collecting bees
	Anthrenoides micans Urban, 1995	Non-oil-collecting bees
	Chalepogenus muelleri (Friese, 1899)	Tapinotaspidini bees
	Lanthanomelissa clementis Urban, 1996	Tapinotaspidini bees
	Lanthanomelissa discrepans Holmberg, 1903	Tapinotaspidini bees
	Lanthanomelissa pampicola Urban, 1995	Tapinotaspidini bees
	Trigona spinipes (Fabricius, 1793)	Non-oil-collecting bees
Sisyrinchium pachyrhizum Baker	*Augochlorodes clementis* Gonçalves & Melo, 2008	Non-oil-collecting bees
	Lanthanomelissa discrepans Holmberg, 1903	Tapinotaspidini bees

	Rhophitulus holostictus (Schlindwein & Moure, 1998)	Non-oil-collecting bees
Sisyrinchium platense I.M. Johnst.	*Chalepogenus roitmani* Roig-Alsina, 1999	Tapinotaspidini bees
Sisyrinchium restioides Spreng.	*Psaenythia annulata* Gerstaecker, 1868	Non-oil-collecting bees
Sisyrinchium setaceum Klatt	*Lanthanomelissa discrepans* Holmberg, 1903	Tapinotaspidini bees
	Lanthanomelissa magaliae Urban, 1996	Tapinotaspidini bees
Sisyrinchium vaginatum Spreng.	*Apis mellifera* Linnaeus, 1758	Non-oil-collecting bees
	Augochloropsis sympleres (Vachal, 1903)	Non-oil-collecting bees
	Bombus pauloensis Friese, 1913	Non-oil-collecting bees
	Dialictus micheneri (Moure, 1956)	Non-oil-collecting bees
	Dialictus rostratus (Moure, 1947)	Non-oil-collecting bees
	Paratetrapedia punctata Aguiar & Melo, 2011	Tapinotaspidini bees
	Psaenythia bergii Holmberg, 1884	Non-oil-collecting bees
	Pseudagapostemon tessellatus Cure, 1989	Non-oil-collecting bees
	Trigona spinipes (Fabricius, 1793)	Non-oil-collecting bees
Trimezia juncifolia (Klatt) Benth. & Hook.f.	*Geotrigona subterranea* (Friese, 1901)	Non-oil-collecting bees
	Paratrigona lineata (Lepeletier, 1836)	Non-oil-collecting bees
	Pseudaugochlora graminea (Fabricius, 1804)	Non-oil-collecting bees
	Trigonopedia glaberrima (Friese, 1899)	Tapinotaspidini bees
Trimezia spathata (Klatt) Baker	*Lophopedia nigrispinis* (Vachal, 1909)	Tapinotaspidini bees
Tritoniopsis parviflora (Jacq.) G.J. Lewis	*Rediviva gigas* Whitehead & Steiner, 1993	Melittinae bees
KRAMERIACEAE		
Krameria bahiana B.B. Simpson	*Centris aenea* Lepeletier, 1841	Centridini bees
	Centris leprieuri (Spinola, 1841)	Centridini bees
	Centris pulchra Moure, Oliveira & Viana, 2003	Centridini bees
	Centris tarsata Smith, 1874	Centridini bees
	Centris trigonoides Lepeletier, 1841	Centridini bees
	Megachile cylindrica Friese, 1906	Non-oil-collecting bees
Krameria grandiflora A. St.-Hil.	*Arhysoceble huberi* (Ducke, 1908)	Tapinotaspidini bees
	Caenonomada unicalcarata (Ducke, 1908)	Tapinotaspidini bees
	Centris aenea Lepeletier, 1841	Centridini bees

	Centris burgdorfi Friese, 1900	Centridini bees
	Centris byrsonimae Mahlmann & Oliveira, 2012	Non-oil-collecting bees
	Centris caxiensis Ducke, 1907	Centridini bees
	Centris fuscata Lepeletier, 1841	Centridini bees
	Centris hyptidis Ducke, 1908	Centridini bees
	Centris hyptidoides Roig-Alsina, 2000	Centridini bees
	Centris tarsata Smith, 1874	Centridini bees
	Centris thelyopsis Vivallo & Melo, 2009	Centridini bees
	Centris xanthomelaena Moure & Castro, 2001	Centridini bees
	Tapinotaspoides serraticornis (Friese, 1899)	Tapinotaspidini bees
	Xanthopedia globulosa (Friese, 1899)	Tapinotaspidini bees
Krameria tomentosa A. St.-Hil.	*Apis mellifera* Linnaeus, 1758	Non-oil-collecting bees
	Arhysoceble huberi (Ducke, 1908)	Tapinotaspidini bees
	Centris aenea Lepeletier, 1841	Centridini bees
	Centris burgdorfi Friese, 1900	Centridini bees
	Centris caxiensis Ducke, 1907	Centridini bees
	Centris flavifrons (Fabricius, 1775)	Centridini bees
	Centris hyptidis Ducke, 1908	Centridini bees
	Centris nitens Lepeletier, 1841	Centridini bees
	Centris spilopoda Moure, 1969	Centridini bees
	Centris tarsata Smith, 1874	Centridini bees
	Ceratina maculifrons Smith, 1854	Non-oil-collecting bees
	Epicharis nigrita Friese, 1900	Centridini bees
	Nannotrigona punctata (Smith, 1854)	Non-oil-collecting bees
	Tetrapedia diversipes Klug, 1810	Tetrapediini bees
	Trigona fulviventris Guérin-Méneville, 1845	Non-oil-collecting bees
	Trigona fuscipennis Friese, 1900	Non-oil-collecting bees
	Trigona spinipes (Fabricius, 1793)	Non-oil-collecting bees
	Xanthopedia larocai Moure, 1995	Tapinotaspidini bees
	Ornidia obesa Fabricius, 1775	Fly
MALPIGHIACEAE		
Alicia anisopetala (A. Juss.) WR Anderson	*Cephalotes pusillus* (Klug, 1824)	Ants
	Centris bicolor Lepeletier, 1841	Centridini bees
	Centris collaris Lepeletier, 1841	Centridini bees
	Centris discolor Smith, 1874	Centridini bees
	Centris mocsaryi Friese, 1899	Centridini bees
	Epicharis affinis Smith, 1874	Centridini bees

	Epicharis flava (Friese, 1900)	Centridini bees
	Leurotrigona muelleri (Friese, 1900)	Non-oil-collecting bees
	Paratrigona lineata (Lepeletier, 1836)	Non-oil-collecting bees
	Tetrapedia diversipes Klug, 1810	Tetrapediini bees
	Tetrapedia peckoltii Friese, 1899	Tetrapediini bees
Aspicarpa pulchella (Griseb.) O'Donell & Lourteig	*Arhysoceble dichroopoda* Moure, 1948	Tapinotaspidini bees
	Centris tarsata Smith, 1874	Centridini bees
Banisteriopsis adenopoda (A. Juss.) B. Gates	*Centris bicolor* Lepeletier, 1841	Centridini bees
	Centris collaris Lepeletier, 1841	Centridini bees
	Centris discolor Smith, 1874	Centridini bees
	Centris dorsata Lepeletier, 1841	Centridini bees
	Centris fuscata Lepeletier, 1841	Centridini bees
	Centris mocsaryi Friese, 1899	Centridini bees
	Centris scopipes Friese, 1899	Centridini bees
	Centris sponsa Smith, 1854	Centridini bees
	Epicharis affinis Smith, 1874	Centridini bees
	Epicharis analis Lepeletier, 1841	Centridini bees
	Epicharis flava (Friese, 1900)	Centridini bees
	Epicharis obscura Friese, 1899	Centridini bees
	Epicharis picta (Smith, 1874)	Centridini bees
	Melipona quadrifasciata Lepeletier, 1836	Non-oil-collecting bees
	Tetrapedia diversipes Klug, 1810	Tetrapediini bees
	Trigona spinipes (Fabricius, 1793)	Non-oil-collecting bees
Banisteriopsis anisandra (A. Juss.) B. Gates	*Centris nitens* Lepeletier, 1841	Centridini bees
	Centris sponsa Smith, 1854	Centridini bees
	Centris tarsata Smith, 1874	Centridini bees
	Epicharis bicolor Smith, 1854	Centridini bees
*Banisteriopsis aphrodisiaca**	*Pheidole gertrudae* Forel, 1886	Ants
	Leurotrigona muelleri (Friese, 1900)	Non-oil-collecting bees
	Paratrigona subnuda Moure, 1947	Non-oil-collecting bees
	Trigona spinipes (Fabricius, 1793)	Non-oil-collecting bees
Banisteriopsis argyrophylla (A. Juss.) B. Gates	*Centris scopipes* Friese, 1899	Centridini bees
	Centris sponsa Smith, 1854	Centridini bees
	Ceratina muelleri Friese, 1910	Non-oil-collecting bees
	Epicharis affinis Smith, 1874	Centridini bees
	Epicharis analis Lepeletier, 1841	Centridini bees
	Trigona spinipes (Fabricius, 1793)	Non-oil-collecting bees

Banisteriopsis campestris (A. Juss.) Little	*Centris dorsata* Lepeletier, 1841	Centridini bees
	Centris mocsaryi Friese, 1899	Centridini bees
	Centris obsoleta Lepeletier, 1841	Centridini bees
	Centris scopipes Friese, 1899	Centridini bees
	Centris sponsa Smith, 1854	Centridini bees
	Epicharis analis Lepeletier, 1841	Centridini bees
	Epicharis bicolor Smith, 1854	Centridini bees
	Epicharis cockerelli Friese, 1900	Centridini bees
	Epicharis flava (Friese, 1900)	Centridini bees
	Epicharis iheringii Friese, 1899	Centridini bees
	Epicharis maculata Smith, 1874	Centridini bees
	Exomalopsis auropilosa Spinola, 1853	Non-oil-collecting bees
	Lophopedia pygmaea (Schrottky, 1902)	Tapinotaspidini bees
	Monoeca brasiliensis Lepeletier & Audinet-Serville, 1828	Tapinotaspidini bees
	Paratrigona lineata (Lepeletier, 1836)	Non-oil-collecting bees
	Tetrapedia curvitarsis Friese, 1899	Tetrapediini bees
	Tetrapedia diversipes Klug, 1810	Tetrapediini bees
	Tetrapedia peckoltii Friese, 1899	Tetrapediini bees
	Trigona spinipes (Fabricius, 1793)	Non-oil-collecting bees
	Tropidopedia carinata Aguiar & Melo, 2007	Tapinotaspidini bees
	Tropidopedia flavolineata Aguiar & Melo, 2007	Tapinotaspidini bees
	Tropidopedia nigrocarinata Aguiar & Melo, 2007	Tapinotaspidini bees
	Tropidopedia punctifrons (Smith, 1879)	Tapinotaspidini bees
Banisteriopsis gardneriana (A. Juss.) W.R.Anderson & B.Gates	*Trigona spinipes* (Fabricius, 1793)	Non-oil-collecting bees
Banisteriopsis laevifolia (A. Juss.) B. Gates	*Apis mellifera* Linnaeus, 1758	Non-oil-collecting bees
	Centris longimana Fabricius, 1804	Centridini bees
	Centris lutea Friese, 1899	Centridini bees
	Centris mocsaryi Friese, 1899	Centridini bees
	Centris nitens Lepeletier, 1841	Centridini bees
	Centris scopipes Friese, 1899	Centridini bees
	Centris tarsata Smith, 1874	Centridini bees
	Centris xanthocnemis Perty, 1833	Centridini bees
	Epicharis analis Lepeletier, 1841	Centridini bees
	Epicharis flava (Friese, 1900)	Centridini bees
	Epicharis iheringii Friese, 1899	Centridini bees
	Epicharis maculata Smith, 1874	Centridini bees
	Lophopedia pygmaea (Schrottky, 1902)	Tapinotaspidini bees

	Monoeca pluricincta (Vachal, 1909)	Tapinotaspidini bees
	Paratetrapedia connexa (Vachal, 1909)	Tapinotaspidini bees
	Tetragona clavipes (Fabricius, 1804)	Non-oil-collecting bees
	Trigona spinipes (Fabricius, 1793)	Non-oil-collecting bees
Banisteriopsis malifolia (Nees & Mart.) B. Gates	*Augochloropsis patens* (Vachal, 1903)	Non-oil-collecting bees
	Augochloropsis smithiana (Cockerell, 1900)	Non-oil-collecting bees
	Bombus pauloensis Friese, 1913	Non-oil-collecting bees
	Centris aenea Lepeletier, 1841	Centridini bees
	Centris collaris Lepeletier, 1841	Centridini bees
	Centris dentata Smith, 1854	Centridini bees
	Centris dorsata Lepeletier, 1841	Centridini bees
	Centris flavifrons (Fabricius, 1775)	Centridini bees
	Centris fuscata Lepeletier, 1841	Centridini bees
	Centris lutea Friese, 1899	Centridini bees
	Centris machadoi Azevedo & Silveira, 2005	Centridini bees
	Centris nitens Lepeletier, 1841	Centridini bees
	Centris rhodoprocta Moure & Seabra, 1960	Centridini bees
	Centris scopipes Friese, 1899	Centridini bees
	Centris spilopoda Moure, 1969	Centridini bees
	Centris sponsa Smith, 1854	Centridini bees
	Centris tarsata Smith, 1874	Centridini bees
	Centris varia (Erichson, 1849)	Centridini bees
	Centris violacea Lepeletier, 1841	Centridini bees
	Epicharis affinis Smith, 1874	Centridini bees
	Epicharis analis Lepeletier, 1841	Centridini bees
	Epicharis bicolor Smith, 1854	Centridini bees
	Epicharis flava (Friese, 1900)	Centridini bees
	Epicharis iheringii Friese, 1899	Centridini bees
	Epicharis picta (Smith, 1874)	Centridini bees
	Eulaema nigrita Lepeletier, 1841	Non-oil-collecting bees
	Exomalopsis analis Spinola, 1853	Non-oil-collecting bees
	Exomalopsis fulvofasciculata Smith, 1879	Non-oil-collecting bees
	Lophopedia pygmaea (Schrottky, 1902)	Tapinotaspidini bees
	Monoeca brasiliensis Lepeletier & Audinet-Serville, 1828	Tapinotaspidini bees
	Paratetrapedia connexa (Vachal, 1909)	Tapinotaspidini bees
	Paratetrapedia punctata Aguiar & Melo, 2011	Tapinotaspidini bees

	Paratrigona lineata (Lepeletier, 1836)	Non-oil-collecting bees
	Scaptotrigona tubiba (Smith, 1863)	Non-oil-collecting bees
	Tetrapedia curvitarsis Friese, 1899	Tetrapediini bees
	Tetrapedia diversipes Klug, 1810	Tetrapediini bees
	Trigona spinipes (Fabricius, 1793)	Non-oil-collecting bees
	Tropidopedia carinata Aguiar & Melo, 2007	Tapinotaspidini bees
	Tropidopedia flavolineata Aguiar & Melo, 2007	Tapinotaspidini bees
	Tropidopedia punctifrons (Smith, 1879)	Tapinotaspidini bees
	Xylocopa hirsutissima Maidl, 1912	Non-oil-collecting bees
Banisteriopsis megaphylla (A. Juss.) B. Gates	*Centris longimana* Fabricius, 1804	Centridini bees
	Centris nitens Lepeletier, 1841	Centridini bees
	Centris scopipes Friese, 1899	Centridini bees
	Epicharis analis Lepeletier, 1841	Centridini bees
Banisteriopsis muricata (Cav.) Cuatrec.	*Apis mellifera* Linnaeus, 1758	Non-oil-collecting bees
	Centris aenea Lepeletier, 1841	Centridini bees
	Centris bicolor Lepeletier, 1841	Centridini bees
	Centris caxiensis Ducke, 1907	Centridini bees
	Centris collaris Lepeletier, 1841	Centridini bees
	Centris flavifrons (Fabricius, 1775)	Centridini bees
	Centris fuscata Lepeletier, 1841	Centridini bees
	Centris mocsaryi Friese, 1899	Centridini bees
	Centris obsoleta Lepeletier, 1841	Centridini bees
	Centris rhodoprocta Moure & Seabra, 1960	Centridini bees
	Centris similis (Fabricius, 1804)	Centridini bees
	Centris tarsata Smith, 1874	Centridini bees
	Centris trigonoides Lepeletier, 1841	Centridini bees
	Epicharis affinis Smith, 1874	Centridini bees
	Epicharis analis Lepeletier, 1841	Centridini bees
	Epicharis flava (Friese, 1900)	Centridini bees
	Epicharis obscura Friese, 1899	Centridini bees
	Epicharis rustica (Olivier, 1789)	Centridini bees
	Tetrapedia diversipes Klug, 1810	Tetrapediini bees
	Tetrapedia rugulosa Friese, 1899	Tetrapediini bees
	Trigona spinipes (Fabricius, 1793)	Non-oil-collecting bees
	Xylocopa grisescens Lepeletier, 1841	Non-oil-collecting bees
Banisteriopsis nummifera (A. Juss.) B. Gates	*Centris burgdorfi* Friese, 1900	Centridini bees
	Centris fuscata Lepeletier, 1841	Centridini bees
	Centris rupestris Azevedo & Silveira, 2005	Centridini bees

	Centris tarsata Smith, 1874	Centridini bees
	Epicharis bicolor Smith, 1854	Centridini bees
Banisteriopsis oxyclada (A. Juss.) B. Gates	*Centris aenea* Lepeletier, 1841	Centridini bees
	Centris collaris Lepeletier, 1841	Centridini bees
	Centris dorsata Lepeletier, 1841	Centridini bees
	Centris mocsaryi Friese, 1899	Centridini bees
	Centris obsoleta Lepeletier, 1841	Centridini bees
	Centris scopipes Friese, 1899	Centridini bees
	Centris sponsa Smith, 1854	Centridini bees
	Centris trigonoides Lepeletier, 1841	Centridini bees
	Epicharis analis Lepeletier, 1841	Centridini bees
	Epicharis bicolor Smith, 1854	Centridini bees
	Epicharis flava (Friese, 1900)	Centridini bees
	Epicharis picta (Smith, 1874)	Centridini bees
Banisteriopsis schizoptera (A. Juss.) B. Gates	*Centris aenea* Lepeletier, 1841	Centridini bees
	Centris bicolor Lepeletier, 1841	Centridini bees
	Centris caxiensis Ducke, 1907	Centridini bees
	Centris flavifrons (Fabricius, 1775)	Centridini bees
	Centris fuscata Lepeletier, 1841	Centridini bees
	Centris machadoi Azevedo & Silveira, 2005	Centridini bees
	Centris scopipes Friese, 1899	Centridini bees
	Centris tarsata Smith, 1874	Centridini bees
	Centris trigonoides Lepeletier, 1841	Centridini bees
	Epicharis bicolor Smith, 1854	Centridini bees
	Epicharis flava (Friese, 1900)	Centridini bees
	Epicharis iheringii Friese, 1899	Centridini bees
	Epicharis morio Friese, 1924	Centridini bees
	Trigona spinipes (Fabricius, 1793)	Non-oil-collecting bees
Banisteriopsis stellaris (Griseb.) B. Gates	*Centris aenea* Lepeletier, 1841	Centridini bees
	Centris burgdorfi Friese, 1900	Centridini bees
	Centris caxiensis Ducke, 1907	Centridini bees
	Centris fuscata Lepeletier, 1841	Centridini bees
	Centris nitens Lepeletier, 1841	Centridini bees
	Centris rhodoprocta Moure & Seabra, 1960	Centridini bees
	Centris tarsata Smith, 1874	Centridini bees
	Centris xanthocnemis Perty, 1833	Centridini bees
	Epicharis bicolor Smith, 1854	Centridini bees
	Epicharis flava (Friese, 1900)	Centridini bees
	Trigona spinipes (Fabricius, 1793)	Non-oil-collecting bees
Banisteriopsis variabilis B. Gates	*Centris aenea* Lepeletier, 1841	Centridini bees
	Centris lutea Friese, 1899	Centridini bees
	Centris nitens Lepeletier, 1841	Centridini bees

	Centris obsoleta Lepeletier, 1841	Centridini bees
	Centris rupestris Azevedo & Silveira, 2005	Centridini bees
	Centris scopipes Friese, 1899	Centridini bees
	Centris tarsata Smith, 1874	Centridini bees
	Centris trigonoides Lepeletier, 1841	Centridini bees
	Centris violacea Lepeletier, 1841	Centridini bees
	Epicharis bicolor Smith, 1854	Centridini bees
	Epicharis flava (Friese, 1900)	Centridini bees
	Monoeca pluricincta (Vachal, 1909)	Tapinotaspidini bees
	Xylocopa hirsutissima Maidl, 1912	Non-oil-collecting bees
Barnebya harleyi W.R. Anderson & B. Gates	*Centris tarsata* Smith, 1874	Centridini bees
Bunchosia armeniaca (Cav.) DC.	*Xylocopa frontalis* (Olivier, 1789)	Non-oil-collecting bees
Bunchosia lindeniana A.Juss.	*Centris rhodoprocta* Moure & Seabra, 1960	Centridini bees
Bunchosia pallescens Skottsb.	*Tetrapedia diversipes* Klug, 1810	Tetrapediini bees
Bunchosia swartziana Griseb.	*Centris rhodoprocta* Moure & Seabra, 1960	Centridini bees
Byrsonima amoena Cuatrec.	*Centris caxiensis* Ducke, 1907	Centridini bees
	Centris flavifrons (Fabricius, 1775)	Centridini bees
	Paratetrapedia globulosa (Friese, 1899)	Tapinotaspidini bees
Byrsonima basiloba A. Juss.	*Centris nitens* Lepeletier, 1841	Centridini bees
	Epicharis analis Lepeletier, 1841	Centridini bees
	Epicharis bicolor Smith, 1854	Centridini bees
	Epicharis cockerelli Friese, 1900	Centridini bees
	Epicharis flava (Friese, 1900)	Centridini bees
	Epicharis iheringii Friese, 1899	Centridini bees
	Epicharis morio Friese, 1924	Centridini bees
	Paratetrapedia testacea (Smith, 1854)	Tapinotaspidini bees
	Tetrapedia peckoltii Friese, 1899	Tetrapediini bees
Byrsonima brachybotrya Nied.	*Arhysoceble dichroopoda* Moure, 1948	Tapinotaspidini bees
	Paratetrapedia iheringii (Friese, 1899)	Tapinotaspidini bees
	Tetrapedia curvitarsis Friese, 1899	Tetrapediini bees
Byrsonima coccolobifolia Kunth	*Apis mellifera* Linnaeus, 1758	Non-oil-collecting bees
	Augochloropsis callichroa (Cockerell, 1900)	Non-oil-collecting bees
	Augochloropsis cleopatra (Schrottky, 1902)	Non-oil-collecting bees
	Augochloropsis smithiana (Cockerell, 1900)	Non-oil-collecting bees
	Bombus brevivillus Franklin, 1913	Non-oil-collecting bees
	Bombus morio (Swederus, 1787)	Non-oil-collecting bees
	Centris aenea Lepeletier, 1841	Centridini bees

	Centris burgdorfi Friese, 1900	Centridini bees
	Centris cockerelli Fox, 1899	Centridini bees
	*Centris iheringi**	Centridini bees
	Centris mocsaryi Friese, 1899	Centridini bees
	Centris nitens Lepeletier, 1841	Centridini bees
	Centris varia (Erichson, 1849)	Centridini bees
	Epicharis affinis Smith, 1874	Centridini bees
	Epicharis bicolor Smith, 1854	Centridini bees
	Epicharis cockerelli Friese, 1900	Centridini bees
	Epicharis flava (Friese, 1900)	Centridini bees
	Epicharis iheringii Friese, 1899	Centridini bees
	Epicharis rustica (Olivier, 1789)	Centridini bees
	Exomalopsis fulvofasciata Smith, 1879	Non-oil-collecting bees
	Megachile beroni Schrottky*	Non-oil-collecting bees
	*Paratetrapedia xantopoda**	Tapinotaspidini bees
	Paratrigona lineata (Lepeletier, 1836)	Non-oil-collecting bees
	Paroxystoglossa andromache Schrottky, 1909	Non-oil-collecting bees
	Scaptotrigona postica (Latreille, 1807)	Non-oil-collecting bees
	Tetragona clavipes (Fabricius, 1804)	Non-oil-collecting bees
	Tetragonisca angustula (Latreille, 1825)	Non-oil-collecting bees
	Tetrapedia amplitarsis Friese, 1899	Tetrapediini bees
	Tetrapedia curvitarsis Friese, 1899	Tetrapediini bees
	Tetrapedia diversipes Klug, 1810	Tetrapediini bees
	Tetrapedia peckoltii Friese, 1899	Tetrapediini bees
	Tetrapedia rugulosa Friese, 1899	Tetrapediini bees
	Trigona branneri Cockerell, 1912	Non-oil-collecting bees
	Trigona spinipes (Fabricius, 1793)	Non-oil-collecting bees
	Xanthopedia larocai Moure, 1995	Tapinotaspidini bees
	Brachygastra lecheguana (Latreille, 1824)	Wasp
	Polistes lanio (Fabricius, 1775)	Wasp
	Polybia ignobilis (Haliday, 1836)	Wasp
	Polybia sericea (Olivier, 1792)	Wasp
	Apis mellifera Linnaeus, 1758	Non-oil-collecting bees
Byrsonima crassa Nied.	*Arhysoceble dichroopoda* Moure, 1948	Tapinotaspidini bees
	Augochloropsis cleopatra (Schrottky, 1902)	Non-oil-collecting bees

	Augochloropsis smithiana (Cockerell, 1900)	Non-oil-collecting bees
	Bombus brevivillus Franklin, 1913	Non-oil-collecting bees
	Bombus morio (Swederus, 1787)	Non-oil-collecting bees
	Centris burgdorfi Friese, 1900	Centridini bees
	Centris discolor Smith, 1874	Centridini bees
	*Centris iheringi**	Centridini bees
	Centris scopipes Friese, 1899	Centridini bees
	Epicharis affinis Smith, 1874	Centridini bees
	Epicharis analis Lepeletier, 1841	Centridini bees
	Epicharis bicolor Smith, 1854	Centridini bees
	Epicharis iheringii Friese, 1899	Centridini bees
	Epicharis rustica (Olivier, 1789)	Centridini bees
	Megachile beroni Schrottky*	Non-oil-collecting bees
	Megachile rubricata Smith, 1853	Non-oil-collecting bees
	*Paratetrapedia xantopoda**	Tapinotaspidini bees
	Paratrigona lineata (Lepeletier, 1836)	Non-oil-collecting bees
	Tetragona clavipes (Fabricius, 1804)	Non-oil-collecting bees
	Tetrapedia rugulosa Friese, 1899	Tetrapediini bees
	Trigona branneri Cockerell, 1912	Non-oil-collecting bees
	Trigona spinipes (Fabricius, 1793)	Non-oil-collecting bees
	Epipona tatua (Cuv., 1797)	Wasp
	Polybia ignobilis (Haliday, 1836)	Wasp
	Polybia sericea (Olivier, 1792)	Wasp
	*Pseudopolybia vespicipes**	Wasp
Byrsonima crassifolia (L.) Kunth	*Augochloropsis crassigena* Moure, 1943	Non-oil-collecting bees
	Centris adanae Cockerell, 1949	Centridini bees
	Centris aethiocesta Snelling, 1984	Centridini bees
	Centris aethyctera Snelling, 1974	Centridini bees
	Centris bicolor Lepeletier, 1841	Centridini bees
	Centris bicornuta Mocsáry, 1899	Centridini bees
	Centris byrsonimae Mahlmann & Oliveira, 2012	Non-oil-collecting bees
	Centris caxiensis Ducke, 1907	Centridini bees
	Centris dichrootricha (Moure, 1945)	Centridini bees
	Centris flavifrons (Fabricius, 1775)	Centridini bees
	Centris flavofasciata Friese, 1899	Centridini bees

	Centris fuscata Lepeletier, 1841	Centridini bees
	*Centris heithausei**	Centridini bees
	Centris longimana Fabricius, 1804	Centridini bees
	Centris lutea Friese, 1899	Centridini bees
	Centris nitida Smith, 1874	Centridini bees
	Centris rhodoprocta Moure & Seabra, 1960	Centridini bees
	Centris spilopoda Moure, 1969	Centridini bees
	Centris tarsata Smith, 1874	Centridini bees
	Centris trigonoides Lepeletier, 1841	Centridini bees
	Centris varia (Erichson, 1849)	Centridini bees
	Centris vittata Lepeletier, 1841	Centridini bees
	Cephalotrigona capitata (Smith, 1854)	Non-oil-collecting bees
	Dicranthidium arenarium (Ducke, 1907)	Non-oil-collecting bees
	Epicharis bicolor Smith, 1854	Centridini bees
	Epicharis flava (Friese, 1900)	Centridini bees
	Epicharis maculata Smith, 1874	Centridini bees
	Epicharis metatarsalis Friese, 1899	Centridini bees
	Epicharis rustica (Olivier, 1789)	Centridini bees
	Frieseomelitta nigra (Cresson, 1878)	Non-oil-collecting bees
	Paratetrapedia moesta (Cresson, 1878)	Tapinotaspidini bees
	*Paratetrapedia nasuta**	Tapinotaspidini bees
	*Paratetrapedia tarsalis**	Tapinotaspidini bees
	Paratetrapedia testacea (Smith, 1854)	Tapinotaspidini bees
	Tetragona dorsalis (Smith, 1854)	Non-oil-collecting bees
	Tetragonisca angustula (Latreille, 1825)	Non-oil-collecting bees
	Tetrapedia diversipes Klug, 1810	Tetrapediini bees
	Tetrapedia maura Cresson, 1878	Tetrapediini bees
	Trigona fulviventris Guérin-Méneville, 1845	Non-oil-collecting bees
	Trigona fuscipennis Friese, 1900	Non-oil-collecting bees
	Trigona muzoensis Schwarz, 1948	Non-oil-collecting bees
	Trigona pallens (Fabricius, 1798)	Non-oil-collecting bees
Byrsonima crispa A. Juss.	*Epicharis metatarsalis* Friese, 1899	Centridini bees
Byrsonima cydoniifolia A.Juss.	*Alepidosceles hamata* Moure, 1947	Non-oil-collecting bees
	Alepidosceles imitatrix (Schrottky, 1909)	Non-oil-collecting bees
	Apis mellifera Linnaeus, 1758	Non-oil-collecting bees

	Centris aenea Lepeletier, 1841	Centridini bees
	Centris caxiensis Ducke, 1907	Centridini bees
	Centris flavifrons (Fabricius, 1775)	Centridini bees
	Centris fuscata Lepeletier, 1841	Centridini bees
	Centris nitens Lepeletier, 1841	Centridini bees
	Centris spilopoda Moure, 1969	Centridini bees
	Centris tarsata Smith, 1874	Centridini bees
	Centris varia (Erichson, 1849)	Centridini bees
	Epicharis analis Lepeletier, 1841	Centridini bees
	Epicharis bicolor Smith, 1854	Centridini bees
	Epicharis cockerelli Friese, 1900	Centridini bees
	Epicharis fasciata Lepeletier & Serville, 1828	Centridini bees
	Epicharis flava (Friese, 1900)	Centridini bees
	Epicharis nigrita Friese, 1900	Centridini bees
	Epicharis xanthogastra Moure & Seabra, 1959	Centridini bees
	Epicharis zonata Smith, 1854	Centridini bees
	Exomalopsis analis Spinola, 1853	Non-oil-collecting bees
	Paratetrapedia punctata Aguiar & Melo, 2011	Tapinotaspidini bees
	Tetragonisca angustula (Latreille, 1825)	Non-oil-collecting bees
	Tetrapedia amplitarsis Friese, 1899	Tetrapediini bees
	Trigona spinipes (Fabricius, 1793)	Non-oil-collecting bees
	Tropidopedia nigrocarinata Aguiar & Melo, 2007	Tapinotaspidini bees
	Urbanapsis diamantina Aguiar & Melo	Tapinotaspidini bees
	Xanthopedia larocai Moure, 1995	Tapinotaspidini bees
Byrsonima gardneriana A. Juss.	*Apis mellifera* Linnaeus, 1758	Non-oil-collecting bees
	Augochloropsis callichroa (Cockerell, 1900)	Non-oil-collecting bees
	Centris aenea Lepeletier, 1841	Centridini bees
	Centris caxiensis Ducke, 1907	Centridini bees
	Centris flavifrons (Fabricius, 1775)	Centridini bees
	Centris fuscata Lepeletier, 1841	Centridini bees
	Centris leprieuri (Spinola, 1841)	Centridini bees
	Centris lutea Friese, 1899	Centridini bees
	Centris nitens Lepeletier, 1841	Centridini bees
	Centris tarsata Smith, 1874	Centridini bees
	Centris trigonoides Lepeletier, 1841	Centridini bees
	Epicharis nigrita Friese, 1900	Centridini bees

	Plebeia minima (Gribodo, 1893)	Non-oil-collecting bees
	Trigona spinipes (Fabricius, 1793)	Non-oil-collecting bees
Byrsonima guilleminiana A. Juss.	*Apis mellifera* Linnaeus, 1758	Non-oil-collecting bees
	Augochloropsis cleopatra (Schrottky, 1902)	Non-oil-collecting bees
	Augochloropsis smithiana (Cockerell, 1900)	Non-oil-collecting bees
	Bombus brevivillus Franklin, 1913	Non-oil-collecting bees
	Bombus morio (Swederus, 1787)	Non-oil-collecting bees
	Centris cockerelli Fox, 1899	Centridini bees
	*Centris iheringi**	Centridini bees
	Epicharis analis Lepeletier, 1841	Centridini bees
	Megachile beroni Schrottky*	Non-oil-collecting bees
	*Paratetrapedia xantopoda**	Tapinotaspidini bees
	Paratrigona lineata (Lepeletier, 1836)	Non-oil-collecting bees
	Tetragona clavipes (Fabricius, 1804)	Non-oil-collecting bees
	Tetrapedia rugulosa Friese, 1899	Tetrapediini bees
	Trigona branneri Cockerell, 1912	Non-oil-collecting bees
	Trigona spinipes (Fabricius, 1793)	Non-oil-collecting bees
Byrsonima intermedia A.Juss.	*Camponotus crassus* Mayr, 1862	Ants
	Cephalotes pusillus (Klug, 1824)	Ants
	Pheidole gertrudae Forel, 1886	Ants
	Apis mellifera Linnaeus, 1758	Non-oil-collecting bees
	Arhysoceble dichroopoda Moure, 1948	Tapinotaspidini bees
	Augochloropsis anisitsi (Schrottky, 1908)	Non-oil-collecting bees
	Augochloropsis aurifluens (Vachal, 1903)	Non-oil-collecting bees
	Augochloropsis illustris (Vachal, 1903)	Non-oil-collecting bees
	Augochloropsis patens (Vachal, 1903)	Non-oil-collecting bees
	Augochloropsis smithiana (Cockerell, 1900)	Non-oil-collecting bees
	Bombus morio (Swederus, 1787)	Non-oil-collecting bees
	Centris aenea Lepeletier, 1841	Centridini bees
	Centris bicolor Lepeletier, 1841	Centridini bees

Centris flavifrons (Fabricius, 1775)	Centridini bees
Centris lutea Friese, 1899	Centridini bees
Centris mocsaryi Friese, 1899	Centridini bees
Centris nitens Lepeletier, 1841	Centridini bees
Centris rhodoprocta Moure & Seabra, 1960	Centridini bees
Centris scopipes Friese, 1899	Centridini bees
Centris spilopoda Moure, 1969	Centridini bees
Centris tarsata Smith, 1874	Centridini bees
Centris varia (Erichson, 1849)	Centridini bees
Epicharis affinis Smith, 1874	Centridini bees
Epicharis albofasciata Smith, 1874	Centridini bees
Epicharis analis Lepeletier, 1841	Centridini bees
Epicharis bicolor Smith, 1854	Centridini bees
Epicharis cockerelli Friese, 1900	Centridini bees
Epicharis fasciata Lepeletier & Serville, 1828	Centridini bees
Epicharis flava (Friese, 1900)	Centridini bees
Epicharis iheringii Friese, 1899	Centridini bees
Epicharis minima (Friese, 1904)	Centridini bees
Epicharis nigrita Friese, 1900	Centridini bees
Epicharis picta (Smith, 1874)	Centridini bees
Epicharis semiflava Moure*	Centridini bees
Friesella schrottkyi (Friese, 1900)	Non-oil-collecting bees
Leurotrigona muelleri (Friese, 1900)	Non-oil-collecting bees
Lophopedia nigrispinis (Vachal, 1909)	Tapinotaspidini bees
Lophopedia pygmaea (Schrottky, 1902)	Tapinotaspidini bees
Paratetrapedia flaveola Aguiar & Melo, 2011	Tapinotaspidini bees
Paratetrapedia lineata (Spinola, 1851)	Tapinotaspidini bees
Paratetrapedia punctata Aguiar & Melo, 2011	Tapinotaspidini bees
Paratrigona lineata (Lepeletier, 1836)	Non-oil-collecting bees
Paratrigona subnuda Moure, 1947	Non-oil-collecting bees
Tetragonisca angustula (Latreille, 1825)	Non-oil-collecting bees
Tetrapedia amplitarsis Friese, 1899	Tetrapediini bees
Tetrapedia curvitarsis Friese, 1899	Tetrapediini bees
Tetrapedia diversipes Klug, 1810	Tetrapediini bees
Tetrapedia imitatrix Moure, 1999	Tetrapediini bees
Tetrapedia rugulosa Friese, 1899	Tetrapediini bees

	Trigona branneri Cockerell, 1912	Non-oil-collecting bees
	Trigona spinipes (Fabricius, 1793)	Non-oil-collecting bees
	Xanthopedia iheringii (Friese, 1899)	Tapinotaspidini bees
	Xanthopedia larocai Moure, 1995	Tapinotaspidini bees
	Xylocopa macrops Lepeletier, 1841	Non-oil-collecting bees
	Xylocopa ordinaria Smith, 1874	Non-oil-collecting bees
	Polybia ignobilis (Haliday, 1836)	Wasp
	Polybia paulista Ihering, 1896	Wasp
Byrsonima laxiflora Griseb.	*Apis mellifera* Linnaeus, 1758	Non-oil-collecting bees
	Augochloropsis cleopatra (Schrottky, 1902)	Non-oil-collecting bees
	Augochloropsis smithiana (Cockerell, 1900)	Non-oil-collecting bees
	Bombus brevivillus Franklin, 1913	Non-oil-collecting bees
	Bombus morio (Swederus, 1787)	Non-oil-collecting bees
	Centris burgdorfi Friese, 1900	Centridini bees
	Centris cockerelli Fox, 1899	Centridini bees
	Centris discolor Smith, 1874	Centridini bees
	*Centris iheringi**	Centridini bees
	Centris longimana Fabricius, 1804	Centridini bees
	Centris nitens Lepeletier, 1841	Centridini bees
	Centris scopipes Friese, 1899	Centridini bees
	Epicharis affinis Smith, 1874	Centridini bees
	Epicharis analis Lepeletier, 1841	Centridini bees
	Epicharis bicolor Smith, 1854	Centridini bees
	Epicharis cockerelli Friese, 1900	Centridini bees
	Epicharis flava (Friese, 1900)	Centridini bees
	Epicharis iheringii Friese, 1899	Centridini bees
	Epicharis minima (Friese, 1904)	Centridini bees
	Epicharis morio Friese, 1924	Centridini bees
	Epicharis picta (Smith, 1874)	Centridini bees
	Epicharis rustica (Olivier, 1789)	Centridini bees
	Oxaea flavescens Klug, 1807	Non-oil-collecting bees
	*Paratetrapedia xantopoda**	Tapinotaspidini bees
	Paratrigona lineata (Lepeletier, 1836)	Non-oil-collecting bees
	Tetragona clavipes (Fabricius, 1804)	Non-oil-collecting bees
	Tetrapedia rugulosa Friese, 1899	Tetrapediini bees

	Trigona branneri Cockerell, 1912	Non-oil-collecting bees
	Trigona spinipes (Fabricius, 1793)	Non-oil-collecting bees
	Brachygastra lecheguana (Latreille, 1824)	Wasp
	Brachygastra moebiana (de Saussure, 1867)	Wasp
	Epipona tatua (Cuv., 1797)	Wasp
	Polybia ignobilis (Haliday, 1836)	Wasp
	Polybia sericea (Olivier, 1792)	Wasp
	*Pseudopolybia vespicipes**	Wasp
Byrsonima lucida (Mill.) DC.	*Apis mellifera* Linnaeus, 1758	Non-oil-collecting bees
	Augochloropsis metallica (Fabricius, 1793)	Non-oil-collecting bees
	Centris errans Fox, 1899	Centridini bees
	Centris nitida Smith, 1874	Centridini bees
Byrsonima microphylla A. Juss.	*Augochloropsis callichroa* (Cockerell, 1900)	Non-oil-collecting bees
	Centris caxiensis Ducke, 1907	Centridini bees
	Centris flavifrons (Fabricius, 1775)	Centridini bees
	Centris leprieuri (Spinola, 1841)	Centridini bees
	Centris trigonoides Lepeletier, 1841	Centridini bees
	Epicharis nigrita Friese, 1900	Centridini bees
Byrsonima pachyphylla A. Juss.	*Apis mellifera* Linnaeus, 1758	Non-oil-collecting bees
	Centris fuscata Lepeletier, 1841	Centridini bees
	Centris lateritia Friese, 1899	Centridini bees
	Centris rupestris Azevedo & Silveira, 2005	Centridini bees
	Centris varia (Erichson, 1849)	Centridini bees
	Centris violacea Lepeletier, 1841	Centridini bees
	Epicharis bicolor Smith, 1854	Centridini bees
	Epicharis flava (Friese, 1900)	Centridini bees
	Paratrigona lineata (Lepeletier, 1836)	Non-oil-collecting bees
	Tetragonisca angustula (Latreille, 1825)	Non-oil-collecting bees
	Tetrapedia imitatrix Moure, 1999	Tetrapediini bees
	Trigona spinipes (Fabricius, 1793)	Non-oil-collecting bees
	Xylocopa ordinaria Smith, 1874	Non-oil-collecting bees
Byrsonima psilandra Griseb.	*Arhysoceble dichroopoda* Moure, 1948	Tapinotaspidini bees
	Centris burgdorfi Friese, 1900	Centridini bees
	Paratetrapedia iheringii (Friese, 1899)	Tapinotaspidini bees
	Paratetrapedia punctata Aguiar & Melo, 2011	Tapinotaspidini bees

Byrsonima rigida A. Juss.	*Centris nitens* Lepeletier, 1841	Centridini bees
	Epicharis bicolor Smith, 1854	Centridini bees
	Epicharis cockerelli Friese, 1900	Centridini bees
	Epicharis iheringii Friese, 1899	Centridini bees
Byrsonima rotunda Griseb.	*Centris aenea* Lepeletier, 1841	Centridini bees
	Centris bicolor Lepeletier, 1841	Centridini bees
	Centris dichrootricha (Moure, 1945)	Centridini bees
	Centris flavifrons (Fabricius, 1775)	Centridini bees
	Centris maranhensis Ducke, 1910	Centridini bees
	Centris spilopoda Moure, 1969	Centridini bees
	Centris sponsa Smith, 1854	Centridini bees
	Centris tarsata Smith, 1874	Centridini bees
	Epicharis bicolor Smith, 1854	Centridini bees
	Frieseomelitta flavicornis (Fabricius, 1798)	Non-oil-collecting bees
	Tetragona quadrangula (Lepeletier, 1836)	Non-oil-collecting bees
	Trigona fulviventris Guérin-Méneville, 1845	Non-oil-collecting bees
	Trigona fuscipennis Friese, 1900	Non-oil-collecting bees
	Trigona pallens (Fabricius, 1798)	Non-oil-collecting bees
	Xanthopedia globulosa (Friese, 1899)	Tapinotaspidini bees
Byrsonima sericea DC.	*Apis mellifera* Linnaeus, 1758	Non-oil-collecting bees
	Augochloropsis callichroa (Cockerell, 1900)	Non-oil-collecting bees
	Augochloropsis electra (Smith, 1853)	Non-oil-collecting bees
	Augochloropsis notophos (Vachal, 1903)	Non-oil-collecting bees
	Augochloropsis rotalis (Vachal, 1903)	Non-oil-collecting bees
	Augochloropsis sparsilis (Vachal, 1903)	Non-oil-collecting bees
	Centris aenea Lepeletier, 1841	Centridini bees
	Centris bicolor Lepeletier, 1841	Centridini bees
	Centris caxiensis Ducke, 1907	Centridini bees
	Centris decolorata Lepeletier, 1841	Centridini bees
	Centris ferruginea Lepeletier, 1841	Centridini bees
	Centris flavifrons (Fabricius, 1775)	Centridini bees
	*Centris frontalis**	Centridini bees
	Centris fuscata Lepeletier, 1841	Centridini bees
	Centris leprieuri (Spinola, 1841)	Centridini bees
	Centris longimana Fabricius, 1804	Centridini bees
	Centris lutea Friese, 1899	Centridini bees

Centris moerens (Perty, 1833)	Centridini bees
Centris nitens Lepeletier, 1841	Centridini bees
Centris rhodoprocta Moure & Seabra, 1960	Centridini bees
Centris spilopoda Moure, 1969	Centridini bees
Centris sponsa Smith, 1854	Centridini bees
Centris tarsata Smith, 1874	Centridini bees
Centris terminata Smith, 1874	Centridini bees
Centris trigonoides Lepeletier, 1841	Centridini bees
Centris varia (Erichson, 1849)	Centridini bees
Ceratina chloris (Fabricius, 1804)	Non-oil-collecting bees
Epicharis affinis Smith, 1874	Centridini bees
Epicharis analis Lepeletier, 1841	Centridini bees
Epicharis bicolor Smith, 1854	Centridini bees
Epicharis cockerelli Friese, 1900	Centridini bees
Epicharis dejeanii Lepeletier, 1841	Centridini bees
Epicharis fasciata Lepeletier & Serville, 1828	Centridini bees
Epicharis flava (Friese, 1900)	Centridini bees
*Epicharis ligulata**	Centridini bees
Epicharis maculata Smith, 1874	Centridini bees
Epicharis nigrita Friese, 1900	Centridini bees
Epicharis obscura Friese, 1899	Centridini bees
Epicharis picta (Smith, 1874)	Centridini bees
Epicharis pygialis (Friese, 1900)	Centridini bees
Epicharis xanthogastra Moure & Seabra, 1959	Centridini bees
Exomalopsis analis Spinola, 1853	Non-oil-collecting bees
Lophopedia minor Aguiar, 2009	Tapinotaspidini bees
Lophopedia nigrispinis (Vachal, 1909)	Tapinotaspidini bees
Lophopedia pulchra Aguiar, 2009	Tapinotaspidini bees
Lophopedia pygmaea (Schrottky, 1902)	Tapinotaspidini bees
Melipona mondury Smith, 1863	Non-oil-collecting bees
Monoeca brasiliensis Lepeletier & Audinet-Serville, 1828	Tapinotaspidini bees
Monoeca mourei Aguiar, 2012	Tapinotaspidini bees
Oxaea flavescens Klug, 1807	Non-oil-collecting bees
Oxytrigona tataira (Smith, 1863)	Non-oil-collecting bees
Paratetrapedia bicolor (Smith, 1854)	Tapinotaspidini bees
Paratetrapedia connexa (Vachal, 1909)	Tapinotaspidini bees

	Paratetrapedia punctata Aguiar & Melo, 2011	Tapinotaspidini bees
	Pseudaugochlora pandora (Smith, 1853)	Non-oil-collecting bees
	Tetragonisca angustula (Latreille, 1825)	Non-oil-collecting bees
	Tetrapedia amplitarsis Friese, 1899	Tetrapediini bees
	Tetrapedia diversipes Klug, 1810	Tetrapediini bees
	Trigona braueri Friese, 1900	Non-oil-collecting bees
	Trigona fulviventris Guérin-Méneville, 1845	Non-oil-collecting bees
	Trigona fuscipennis Friese, 1900	Non-oil-collecting bees
	Trigona spinipes (Fabricius, 1793)	Non-oil-collecting bees
	Tropidopedia nigrocarinata Aguiar & Melo, 2007	Tapinotaspidini bees
	Urbanapsis diamantina Aguiar & Melo	Tapinotaspidini bees
Byrsonima spicata (Cav.) Rich. Ex Kunth	*Centris aenea* Lepeletier, 1841	Centridini bees
	Centris byrsonimae Mahlmann & Oliveira, 2012	Non-oil-collecting bees
	Centris caxiensis Ducke, 1907	Centridini bees
	Centris dichrootricha (Moure, 1945)	Centridini bees
	Centris flavifrons (Fabricius, 1775)	Centridini bees
	Centris leprieuri (Spinola, 1841)	Centridini bees
	Centris longimana Fabricius, 1804	Centridini bees
	Centris rhodoprocta Moure & Seabra, 1960	Centridini bees
	Centris sponsa Smith, 1854	Centridini bees
	Centris tarsata Smith, 1874	Centridini bees
	Epicharis umbraculata (Fabricius, 1804)	Centridini bees
	Melipona flavolineata Friese, 1900	Non-oil-collecting bees
	Paratetrapedia globulosa (Friese, 1899)	Tapinotaspidini bees
	Trigona fulviventris Guérin-Méneville, 1845	Non-oil-collecting bees
	Trigonisca extrema Albuquerque & Camargo, 2007	Non-oil-collecting bees
	Xylocopa cearensis Ducke, 1911	Non-oil-collecting bees
	Xylocopa frontalis (Olivier, 1789)	Non-oil-collecting bees
Byrsonima subterranea Brade & Markgr.	*Apis mellifera* Linnaeus, 1758	Non-oil-collecting bees
	Augochloropsis smithiana (Cockerell, 1900)	Non-oil-collecting bees

	Bombus brevivillus Franklin, 1913	Non-oil-collecting bees
	Bombus morio (Swederus, 1787)	Non-oil-collecting bees
	Centris burgdorfi Friese, 1900	Centridini bees
	Centris cockerelli Fox, 1899	Centridini bees
	Centris discolor Smith, 1874	Centridini bees
	*Centris iheringi**	Centridini bees
	Epicharis affinis Smith, 1874	Centridini bees
	Epicharis analis Lepeletier, 1841	Centridini bees
	Epicharis bicolor Smith, 1854	Centridini bees
	Epicharis iheringii Friese, 1899	Centridini bees
	Epicharis picta (Smith, 1874)	Centridini bees
	Epicharis rustica (Olivier, 1789)	Centridini bees
	Megachile beroni Schrottky*	Non-oil-collecting bees
	*Paratetrapedia xantopoda**	Tapinotaspidini bees
	Paratrigona lineata (Lepeletier, 1836)	Non-oil-collecting bees
	Tetragona clavipes (Fabricius, 1804)	Non-oil-collecting bees
	Tetrapedia rugulosa Friese, 1899	Tetrapediini bees
	Trigona branneri Cockerell, 1912	Non-oil-collecting bees
	Trigona spinipes (Fabricius, 1793)	Non-oil-collecting bees
Byrsonima umbellata Mart. ex A. Juss.	*Apis mellifera* Linnaeus, 1758	Non-oil-collecting bees
	Augochloropsis cleopatra (Schrottky, 1902)	Non-oil-collecting bees
	Augochloropsis smithiana (Cockerell, 1900)	Non-oil-collecting bees
	Bombus brevivillus Franklin, 1913	Non-oil-collecting bees
	Bombus morio (Swederus, 1787)	Non-oil-collecting bees
	Centris aenea Lepeletier, 1841	Centridini bees
	Centris bicolor Lepeletier, 1841	Centridini bees
	Centris burgdorfi Friese, 1900	Centridini bees
	Centris cockerelli Fox, 1899	Centridini bees
	Centris decolorata Lepeletier, 1841	Centridini bees
	Centris denudans Lepeletier, 1841	Centridini bees
	Centris flavifrons (Fabricius, 1775)	Centridini bees
	Centris fuscata Lepeletier, 1841	Centridini bees
	*Centris iheringi**	Centridini bees
	Centris longimana Fabricius, 1804	Centridini bees
	Centris maranhensis Ducke, 1910	Centridini bees

	Centris rhodoprocta Moure & Seabra, 1960	Centridini bees
	Centris scopipes Friese, 1899	Centridini bees
	Centris spilopoda Moure, 1969	Centridini bees
	Centris sponsa Smith, 1854	Centridini bees
	Centris tarsata Smith, 1874	Centridini bees
	Centris trigonoides Lepeletier, 1841	Centridini bees
	Epicharis affinis Smith, 1874	Centridini bees
	Epicharis analis Lepeletier, 1841	Centridini bees
	Epicharis bicolor Smith, 1854	Centridini bees
	Epicharis iheringii Friese, 1899	Centridini bees
	Epicharis picta (Smith, 1874)	Centridini bees
	Epicharis rustica (Olivier, 1789)	Centridini bees
	Frieseomelitta flavicornis (Fabricius, 1798)	Non-oil-collecting bees
	Frieseomelitta silvestrii (Friese, 1902)	Non-oil-collecting bees
	Megachile beroni Schrottky*	Non-oil-collecting bees
	Megachile rubricata Smith, 1853	Non-oil-collecting bees
	Paratetrapedia leucostoma (Cockerell, 1923)	Tapinotaspidini bees
	Paratetrapedia testacea (Smith, 1854)	Tapinotaspidini bees
	*Paratetrapedia xantopoda**	Tapinotaspidini bees
	Paratrigona lineata (Lepeletier, 1836)	Non-oil-collecting bees
	Tetragona clavipes (Fabricius, 1804)	Non-oil-collecting bees
	Tetragona quadrangula (Lepeletier, 1836)	Non-oil-collecting bees
	Tetragonisca angustula (Latreille, 1825)	Non-oil-collecting bees
	Tetrapedia diversipes Klug, 1810	Tetrapediini bees
	Tetrapedia rugulosa Friese, 1899	Tetrapediini bees
	Trigona branneri Cockerell, 1912	Non-oil-collecting bees
	Trigona fulviventris Guérin-Méneville, 1845	Non-oil-collecting bees
	Trigona pallens (Fabricius, 1798)	Non-oil-collecting bees
	Trigona spinipes (Fabricius, 1793)	Non-oil-collecting bees
	Trigonisca intermedia Moure, 1989	Non-oil-collecting bees
	Brachygastra lecheguana (Latreille, 1824)	Wasp
	Brachygastra moebiana (de Saussure, 1867)	Wasp
	Epipona tatua (Cuv., 1797)	Wasp

	*Pseudopolybia vespicipes**	Wasp
Byrsonima vacciniifolia A. Juss.	*Centris aenea* Lepeletier, 1841	Centridini bees
	Centris nitens Lepeletier, 1841	Centridini bees
	Centris rhodoprocta Moure & Seabra, 1960	Centridini bees
	Centris tarsata Smith, 1874	Centridini bees
	Centris varia (Erichson, 1849)	Centridini bees
	Epicharis bicolor Smith, 1854	Centridini bees
	Tetrapedia diversipes Klug, 1810	Tetrapediini bees
	Xanthopedia larocai Moure, 1995	Tapinotaspidini bees
Byrsonima variabilis A. Juss.	*Arhysoceble dichroopoda* Moure, 1948	Tapinotaspidini bees
	Augochloropsis cleopatra (Schrottky, 1902)	Non-oil-collecting bees
	Augochloropsis cognata Moure, 1944	Non-oil-collecting bees
	Bombus pauloensis Friese, 1913	Non-oil-collecting bees
	Centris discolor Smith, 1874	Centridini bees
	Centris insularis Smith, 1874	Centridini bees
	Centris klugii Friese, 1899	Centridini bees
	Centris tarsata Smith, 1874	Centridini bees
	Centris varia (Erichson, 1849)	Centridini bees
	Melipona quadrifasciata Lepeletier, 1836	Non-oil-collecting bees
	Melipona quinquefasciata Lepeletier, 1836	Non-oil-collecting bees
	*Paratetrapedia tricolor**	Tapinotaspidini bees
	Paratrigona lineata (Lepeletier, 1836)	Non-oil-collecting bees
	Plebeia saiqui (Friese, 1900)	Non-oil-collecting bees
	Trigona spinipes (Fabricius, 1793)	Non-oil-collecting bees
Byrsonima verbascifolia (L.) DC.	*Apis mellifera* Linnaeus, 1758	Non-oil-collecting bees
	Augochloropsis cleopatra (Schrottky, 1902)	Non-oil-collecting bees
	Augochloropsis smithiana (Cockerell, 1900)	Non-oil-collecting bees
	Bombus brevivillus Franklin, 1913	Non-oil-collecting bees
	Bombus morio (Swederus, 1787)	Non-oil-collecting bees
	Centris burgdorfi Friese, 1900	Centridini bees
	Centris cockerelli Fox, 1899	Centridini bees
	Centris discolor Smith, 1874	Centridini bees
	Centris flavifrons (Fabricius, 1775)	Centridini bees
	Centris fuscata Lepeletier, 1841	Centridini bees

	Centris nitens Lepeletier, 1841	Centridini bees
	Centris rupestris Azevedo & Silveira, 2005	Centridini bees
	Centris scopipes Friese, 1899	Centridini bees
	Centris tarsata Smith, 1874	Centridini bees
	Centris varia (Erichson, 1849)	Centridini bees
	Epicharis analis Lepeletier, 1841	Centridini bees
	Epicharis bicolor Smith, 1854	Centridini bees
	Epicharis iheringii Friese, 1899	Centridini bees
	Epicharis rustica (Olivier, 1789)	Centridini bees
	Exomalopsis fulvofasciata Smith, 1879	Non-oil-collecting bees
	Geotrigona mombuca (Smith, 1863)	Non-oil-collecting bees
	Megachile beroni Schrottky*	Non-oil-collecting bees
	Megachile rubricata Smith, 1853	Non-oil-collecting bees
	Melipona rufiventris Lepeletier, 1836	Non-oil-collecting bees
	*Paratetrapedia xantopoda**	Tapinotaspidini bees
	Paratrigona lineata (Lepeletier, 1836)	Non-oil-collecting bees
	Tetragona clavipes (Fabricius, 1804)	Non-oil-collecting bees
	Tetragonisca angustula (Latreille, 1825)	Non-oil-collecting bees
	Tetrapedia rugulosa Friese, 1899	Tetrapediini bees
	Trigona branneri Cockerell, 1912	Non-oil-collecting bees
	Trigona spinipes (Fabricius, 1793)	Non-oil-collecting bees
	Epipona tatua (Cuv., 1797)	Wasp
	Polybia ignobilis (Haliday, 1836)	Wasp
	Polybia sericea (Olivier, 1792)	Wasp
	*Pseudopolybia vespicipes**	Wasp
Carolus chasei (W.R.Anderson) W.R.Anderson	*Apis mellifera* Linnaeus, 1758	Non-oil-collecting bees
	Centris aenea Lepeletier, 1841	Centridini bees
	Centris caxiensis Ducke, 1907	Centridini bees
	Centris fuscata Lepeletier, 1841	Centridini bees
	Centris tarsata Smith, 1874	Centridini bees
Dicella bracteosa (A. Juss.) Griseb.	*Centris aenea* Lepeletier, 1841	Centridini bees
	Centris bicolor Lepeletier, 1841	Centridini bees
	Centris caxiensis Ducke, 1907	Centridini bees
	Centris collaris Lepeletier, 1841	Centridini bees
	Centris discolor Smith, 1874	Centridini bees
	Centris flavifrons (Fabricius, 1775)	Centridini bees

	Centris fuscata Lepeletier, 1841	Centridini bees
	Centris labrosa Friese, 1899	Centridini bees
	Centris mocsaryi Friese, 1899	Centridini bees
	Centris nitens Lepeletier, 1841	Centridini bees
	Centris tarsata Smith, 1874	Centridini bees
	Centris trigonoides Lepeletier, 1841	Centridini bees
	Epicharis affinis Smith, 1874	Centridini bees
	Epicharis analis Lepeletier, 1841	Centridini bees
	Epicharis flava (Friese, 1900)	Centridini bees
Diplopterys lutea (Griseb.) W.R.Anderson & C.Davis	*Centris bicolor* Lepeletier, 1841	Centridini bees
	Centris tarsata Smith, 1874	Centridini bees
	Epicharis affinis Smith, 1874	Centridini bees
	Epicharis flava (Friese, 1900)	Centridini bees
Diplopterys pubipetala (A. Juss.) W.R. Anderson & C. Davis	*Cephalotes pusillus* (Klug, 1824)	Ants
	Pheidole gertrudae Forel, 1886	Ants
	Apis mellifera Linnaeus, 1758	Non-oil-collecting bees
	Caenonomada bruneri Ashmead, 1899	Tapinotaspidini bees
	Centris aenea Lepeletier, 1841	Centridini bees
	Centris burgdorfi Friese, 1900	Centridini bees
	Centris caxiensis Ducke, 1907	Centridini bees
	Centris flavifrons (Fabricius, 1775)	Centridini bees
	Centris fuscata Lepeletier, 1841	Centridini bees
	Centris nitens Lepeletier, 1841	Centridini bees
	Centris rhodoprocta Moure & Seabra, 1960	Centridini bees
	Centris rupestris Azevedo & Silveira, 2005	Centridini bees
	Centris tarsata Smith, 1874	Centridini bees
	Centris trigonoides Lepeletier, 1841	Centridini bees
	Centris varia (Erichson, 1849)	Centridini bees
	Epicharis bicolor Smith, 1854	Centridini bees
	Epicharis flava (Friese, 1900)	Centridini bees
	Leurotrigona muelleri (Friese, 1900)	Non-oil-collecting bees
	Lophopedia pygmaea (Schrottky, 1902)	Tapinotaspidini bees
	Monoeca brasiliensis Lepeletier & Audinet-Serville, 1828	Tapinotaspidini bees
	Monoeca lanei (Moure, 1944)	Tapinotaspidini bees
	Paratrigona lineata (Lepeletier, 1836)	Non-oil-collecting bees
	Tetrapedia imitatrix Moure, 1999	Tetrapediini bees
	Trigona spinipes (Fabricius, 1793)	Non-oil-collecting bees
	Tropidopedia nigrocarinata Aguiar & Melo, 2007	Tapinotaspidini bees

Heteropterys alternifolia W.R. Anderson	*Apis mellifera* Linnaeus, 1758	Non-oil-collecting bees
	Centris caxiensis Ducke, 1907	Centridini bees
	Centris flavifrons (Fabricius, 1775)	Centridini bees
	Centris fuscata Lepeletier, 1841	Centridini bees
	Centris leprieuri (Spinola, 1841)	Centridini bees
	Centris lutea Friese, 1899	Centridini bees
	Centris sponsa Smith, 1854	Centridini bees
	Centris trigonoides Lepeletier, 1841	Centridini bees
	Epicharis nigrita Friese, 1900	Centridini bees
	Trigona spinipes (Fabricius, 1793)	Non-oil-collecting bees
Heteropterys argyrophaea A.Juss.	*Pheidole gertrudae* Forel, 1886	Ants
	Epicharis flava (Friese, 1900)	Centridini bees
	Leurotrigona muelleri (Friese, 1900)	Non-oil-collecting bees
	Paratrigona lineata (Lepeletier, 1836)	Non-oil-collecting bees
	Trigona spinipes (Fabricius, 1793)	Non-oil-collecting bees
	Ornidia obesa Fabricius, 1775	Fly
Heteropterys brachiata (L.) DC.	*Centris rhodoprocta* Moure & Seabra, 1960	Centridini bees
Heteropterys byrsonimifolia A. Juss.	*Centris aenea* Lepeletier, 1841	Centridini bees
	Centris flavifrons (Fabricius, 1775)	Centridini bees
	Centris fuscata Lepeletier, 1841	Centridini bees
	Centris nitens Lepeletier, 1841	Centridini bees
	Centris rhodoprocta Moure & Seabra, 1960	Centridini bees
	Centris tarsata Smith, 1874	Centridini bees
	Centris varia (Erichson, 1849)	Centridini bees
	Centris violacea Lepeletier, 1841	Centridini bees
	Epicharis flava (Friese, 1900)	Centridini bees
	*Monoeca luteocincta**	Tapinotaspidini bees
	Paratetrapedia connexa (Vachal, 1909)	Tapinotaspidini bees
	Tetrapedia diversipes Klug, 1810	Tetrapediini bees
	Agelaia pallipes (Olivier, 1791)	Wasp
	Brachygastra lecheguana (Latreille, 1824)	Wasp
	Polistes simillimus Zikan, 1951	Wasp
	Polybia ignobilis (Haliday, 1836)	Wasp
	Polybia paulista Ihering, 1896	Wasp
Heteropterys campestris A. Juss.	*Epicharis flava* (Friese, 1900)	Centridini bees
	Monoeca pluricincta (Vachal, 1909)	Tapinotaspidini bees
Heteropterys intermedia (A. Juss.) Griseb.	*Centris rhodoprocta* Moure & Seabra, 1960	Centridini bees
	Centris simplex Friese	Centridini bees
	Centris vittata Lepeletier, 1841	Centridini bees
	Epicharis affinis Smith, 1874	Centridini bees

	Epicharis flava (Friese, 1900)	Centridini bees
	Epicharis obscura Friese, 1899	Centridini bees
	Paratetrapedia maculata (Friese, 1899)	Tapinotaspidini bees
	Paratetrapedia pygmaea (Schrottky, 1902)	Tapinotaspidini bees
	Tetrapedia diversipes Klug, 1810	Tetrapediini bees
	Tetrapedia rugulosa Friese, 1899	Tetrapediini bees
Heteropterys nervosa A. Juss.	*Centris fuscata* Lepeletier, 1841	Centridini bees
Heteropterys pteropetala A. Juss.	*Centris mocsaryi* Friese, 1899	Centridini bees
	Centris rhodoprocta Moure & Seabra, 1960	Centridini bees
	Centris scopipes Friese, 1899	Centridini bees
	Centris tarsata Smith, 1874	Centridini bees
	Epicharis analis Lepeletier, 1841	Centridini bees
	Epicharis flava (Friese, 1900)	Centridini bees
	Epicharis iheringii Friese, 1899	Centridini bees
	Epicharis morio Friese, 1924	Centridini bees
	Monoeca pluricincta (Vachal, 1909)	Tapinotaspidini bees
Heteropterys tomentosa A. Juss.	*Centris tarsata* Smith, 1874	Centridini bees
	Centris trigonoides Lepeletier, 1841	Centridini bees
	Tetrapedia diversipes Klug, 1810	Tetrapediini bees
	Tetrapedia peckoltii Friese, 1899	Tetrapediini bees
Heteropterys umbellata A. Juss.	*Centris flavifrons* (Fabricius, 1775)	Centridini bees
	Centris fuscata Lepeletier, 1841	Centridini bees
	Centris nitens Lepeletier, 1841	Centridini bees
	Centris tarsata Smith, 1874	Centridini bees
	Centris varia (Erichson, 1849)	Centridini bees
Hiraea cuneata Griseb.	*Apis mellifera* Linnaeus, 1758	Non-oil-collecting bees
	Trigona spinipes (Fabricius, 1793)	Non-oil-collecting bees
Hiraea obovata Huber	*Centris rhodoprocta* Moure & Seabra, 1960	Centridini bees
Janusia anisandra (A. Juss.) Griseb.	*Centris aenea* Lepeletier, 1841	Centridini bees
	Centris fuscata Lepeletier, 1841	Centridini bees
	Centris tarsata Smith, 1874	Centridini bees
Janusia guaranitica (A. St.-Hil.) A. Juss.	*Centris tarsata* Smith, 1874	Centridini bees
	Centris tricolor Friese, 1899	Centridini bees
Lophanthera lactescens Ducke	*Centris longimana* Fabricius, 1804	Centridini bees
Malpighia emarginata DC.	*Apis mellifera* Linnaeus, 1758	Non-oil-collecting bees
	Centris aenea Lepeletier, 1841	Centridini bees
	Centris bicolor Lepeletier, 1841	Centridini bees
	Centris collaris Lepeletier, 1841	Centridini bees
	Centris decolorata Lepeletier, 1841	Centridini bees
	Centris denudans Lepeletier, 1841	Centridini bees
	Centris flavifrons (Fabricius, 1775)	Centridini bees
	Centris fuscata Lepeletier, 1841	Centridini bees

	Centris longimana Fabricius, 1804	Centridini bees
	Centris mocsaryi Friese, 1899	Centridini bees
	Centris nitens Lepeletier, 1841	Centridini bees
	Centris obsoleta Lepeletier, 1841	Centridini bees
	Centris poecila Lepeletier, 1841	Centridini bees
	Centris rhodoprocta Moure & Seabra, 1960	Centridini bees
	Centris scopipes Friese, 1899	Centridini bees
	Centris spilopoda Moure, 1969	Centridini bees
	Centris sponsa Smith, 1854	Centridini bees
	Centris tarsata Smith, 1874	Centridini bees
	Centris terminata Smith, 1874	Centridini bees
	Centris trigonoides Lepeletier, 1841	Centridini bees
	Centris varia (Erichson, 1849)	Centridini bees
	Centris vittata Lepeletier, 1841	Centridini bees
	Epicharis affinis Smith, 1874	Centridini bees
	Epicharis albofasciata Smith, 1874	Centridini bees
	Epicharis analis Lepeletier, 1841	Centridini bees
	Epicharis bicolor Smith, 1854	Centridini bees
	Epicharis cockerelli Friese, 1900	Centridini bees
	Epicharis flava (Friese, 1900)	Centridini bees
	Epicharis nigrita Friese, 1900	Centridini bees
	Epicharis xanthogastra Moure & Seabra, 1959	Centridini bees
	Frieseomelitta doederleini (Friese, 1900)	Non-oil-collecting bees
	Frieseomelitta varia (Lepeletier, 1836)	Non-oil-collecting bees
	Melipona quadrifasciata Lepeletier, 1836	Non-oil-collecting bees
	Nannotrigona testaceicornis (Lepeletier, 1836)	Non-oil-collecting bees
	Tetragonisca angustula (Latreille, 1825)	Non-oil-collecting bees
	Tetrapedia diversipes Klug, 1810	Tetrapediini bees
	Trigona spinipes (Fabricius, 1793)	Non-oil-collecting bees
	Xylocopa cearensis Ducke, 1911	Non-oil-collecting bees
	Xylocopa frontalis (Olivier, 1789)	Non-oil-collecting bees
Malpighia glabra L.	*Apis mellifera* Linnaeus, 1758	Non-oil-collecting bees
	Bombus brevivillus Franklin, 1913	Non-oil-collecting bees
	Centris flavifrons (Fabricius, 1775)	Centridini bees
	Centris lanipes (Fabricius, 1775)	Centridini bees

	Centris rhodoprocta Moure & Seabra, 1960	Centridini bees
	Centris versicolor (Fabricius, 1775)	Centridini bees
	Melipona fasciata Latreille, 1811	Non-oil-collecting bees
	Xylocopa frontalis (Olivier, 1789)	Non-oil-collecting bees
Malpighia lundellii C.V. Morton	*Centris rhodoprocta* Moure & Seabra, 1960	Centridini bees
Mascagnia cordifolia (A. Juss.) Griseb.	*Centris mocsaryi* Friese, 1899	Centridini bees
	Centris nitens Lepeletier, 1841	Centridini bees
	Centris rhodoprocta Moure & Seabra, 1960	Centridini bees
	Centris simplex Friese	Centridini bees
	Centris tarsata Smith, 1874	Centridini bees
	Epicharis analis Lepeletier, 1841	Centridini bees
	Epicharis bicolor Smith, 1854	Centridini bees
	Epicharis cockerelli Friese, 1900	Centridini bees
	Paratetrapedia lineata (Spinola, 1851)	Tapinotaspidini bees
	Tetrapedia diversipes Klug, 1810	Tetrapediini bees
Mascagnia sepium (A. Juss.) Griseb.	*Centris tarsata* Smith, 1874	Centridini bees
	Epicharis flava (Friese, 1900)	Centridini bees
Mcvaughia bahiana W.R. Anderson	*Centris aenea* Lepeletier, 1841	Centridini bees
Niedenzuella acutifolia (Cav.) W.R.Anderson	*Centris collaris* Lepeletier, 1841	Centridini bees
	Centris fuscata Lepeletier, 1841	Centridini bees
	Centris mocsaryi Friese, 1899	Centridini bees
	Centris rhodoprocta Moure & Seabra, 1960	Centridini bees
	Centris simplex Friese	Centridini bees
	Centris tarsata Smith, 1874	Centridini bees
	Epicharis affinis Smith, 1874	Centridini bees
	Epicharis flava (Friese, 1900)	Centridini bees
	Monoeca haemorrhoidalis (Smith, 1854)	Tapinotaspidini bees
	Paratetrapedia velutina (Friese, 1910)	Tapinotaspidini bees
	Tetrapedia diversipes Klug, 1810	Tetrapediini bees
	Tetrapedia peckoltii Friese, 1899	Tetrapediini bees
Niedenzuella multiglandulosa (A. Juss.) W.R.Anderson	*Tetrapedia peckoltii* Friese, 1899	Tetrapediini bees
Peixotoa goiana C.E.Anderson	*Centris burgdorfi* Friese, 1900	Centridini bees
	Centris trigonoides Lepeletier, 1841	Centridini bees
	Epicharis morio Friese, 1924	Centridini bees
	Monoeca pluricincta (Vachal, 1909)	Tapinotaspidini bees
	Tetrapedia diversipes Klug, 1810	Tetrapediini bees
Peixotoa hispidula A. Juss.	*Centris rhodoprocta* Moure & Seabra, 1960	Centridini bees
Peixotoa reticulata Griseb.	*Cephalotes possumus**	Ants
	Pheidole gertrudae Forel, 1886	Ants
	Pseudomyrmex gracilis (Fabricius, 1804)	Ants
	Arhysoceble dichroopoda Moure, 1948	Tapinotaspidini bees

	Centris fuscata Lepeletier, 1841	Centridini bees
	Centris lutea Friese, 1899	Centridini bees
	Centris rhodoprocta Moure & Seabra, 1960	Centridini bees
	Centris scopipes Friese, 1899	Centridini bees
	Centris similis (Fabricius, 1804)	Centridini bees
	Centris tarsata Smith, 1874	Centridini bees
	Epicharis flava (Friese, 1900)	Centridini bees
	Epicharis iheringii Friese, 1899	Centridini bees
	Leurotrigona muelleri (Friese, 1900)	Non-oil-collecting bees
	Monoeca lanei (Moure, 1944)	Tapinotaspidini bees
	Paratetrapedia flaveola Aguiar & Melo, 2011	Tapinotaspidini bees
	Paratetrapedia volatillis (Smith, 1879)	Tapinotaspidini bees
	Paratrigona lineata (Lepeletier, 1836)	Non-oil-collecting bees
	Paratrigona subnuda Moure, 1947	Non-oil-collecting bees
	Tetragona clavipes (Fabricius, 1804)	Non-oil-collecting bees
	Tetrapedia imitatrix Moure, 1999	Tetrapediini bees
	Trigona recursa Smith, 1863	Non-oil-collecting bees
	Trigona spinipes (Fabricius, 1793)	Non-oil-collecting bees
Peixotoa tomentosa A. Juss.	*Centris collaris* Lepeletier, 1841	Centridini bees
	Centris dorsata Lepeletier, 1841	Centridini bees
	Centris fuscata Lepeletier, 1841	Centridini bees
	Centris machadoi Azevedo & Silveira, 2005	Centridini bees
	Centris scopipes Friese, 1899	Centridini bees
	Centris sponsa Smith, 1854	Centridini bees
	Centris varia (Erichson, 1849)	Centridini bees
	Epicharis flava (Friese, 1900)	Centridini bees
	Paratetrapedia connexa (Vachal, 1909)	Tapinotaspidini bees
	Paratrigona lineata (Lepeletier, 1836)	Non-oil-collecting bees
	Tetrapedia curvitarsis Friese, 1899	Tetrapediini bees
	Trigona spinipes (Fabricius, 1793)	Non-oil-collecting bees
	Tropidopedia flavolineata Aguiar & Melo, 2007	Tapinotaspidini bees
	Tropidopedia punctifrons (Smith, 1879)	Tapinotaspidini bees
Pterandra pyroidea A. Juss.	*Apis mellifera* Linnaeus, 1758	Non-oil-collecting bees
	Bombus brevivillus Franklin, 1913	Non-oil-collecting bees

	Bombus morio (Swederus, 1787)	Non-oil-collecting bees
	Paratrigona lineata (Lepeletier, 1836)	Non-oil-collecting bees
Spachea membranacea Cuatrec.	*Centris longimana* Fabricius, 1804	Centridini bees
	Paratetrapedia calcarata (Cresson, 1878)	Tapinotaspidini bees
	Paratetrapedia lugubris (Cresson, 1878)	Tapinotaspidini bees
	Paratetrapedia xanthaspis (Cockerell, 1929)	Tapinotaspidini bees
	Trigona fulviventris Guérin-Méneville, 1845	Non-oil-collecting bees
	Trigona fuscipennis Friese, 1900	Non-oil-collecting bees
	Trigona pallens (Fabricius, 1798)	Non-oil-collecting bees
Stigmaphyllon arenicola C.E.Anderson	*Centris conspersa* Mocsáry, 1899	Centridini bees
Stigmaphyllon auriculatum (Cav.) A. Juss.	*Centris aenea* Lepeletier, 1841	Centridini bees
	Centris caxiensis Ducke, 1907	Centridini bees
	Centris flavifrons (Fabricius, 1775)	Centridini bees
	Centris fuscata Lepeletier, 1841	Centridini bees
	Centris moerens (Perty, 1833)	Centridini bees
	Polistes canadensis (Linnaeus, 1758)	Wasp
Stigmaphyllon blanchetii C.E. Anderson	*Centris flavifrons* (Fabricius, 1775)	Centridini bees
Stigmaphyllon bonariense (Hook. & Arn.) C.E. Anderson	*Bombus pauloensis* Friese, 1913	Non-oil-collecting bees
	Centris burgdorfi Friese, 1900	Centridini bees
	Centris flavifrons (Fabricius, 1775)	Centridini bees
	Centris fuscata Lepeletier, 1841	Centridini bees
	Centris obsoleta Lepeletier, 1841	Centridini bees
	Centris sponsa Smith, 1854	Centridini bees
	Centris tarsata Smith, 1874	Centridini bees
	Centris tricolor Friese, 1899	Centridini bees
	Centris trigonoides Lepeletier, 1841	Centridini bees
	Centris varia (Erichson, 1849)	Centridini bees
	Paratetrapedia nigrispinis (Vachal, 1909)	Tapinotaspidini bees
	Paratetrapedia volatillis (Smith, 1879)	Tapinotaspidini bees
	Xylocopa frontalis (Olivier, 1789)	Non-oil-collecting bees
Stigmaphyllon calcaratum N.E. Br.	*Centris fuscata* Lepeletier, 1841	Centridini bees
	Centris spilopoda Moure, 1969	Centridini bees
Stigmaphyllon cavernulosum C.E. Anderson	*Centris rhodoprocta* Moure & Seabra, 1960	Centridini bees
	Centris terminata Smith, 1874	Centridini bees
Stigmaphyllon ciliatum (Lam.) A. Juss.	*Centris aenea* Lepeletier, 1841	Centridini bees
	Centris flavifrons (Fabricius, 1775)	Centridini bees
	Centris fuscata Lepeletier, 1841	Centridini bees
Stigmaphyllon jatrophifolium A. Juss.	*Centris bicolor* Lepeletier, 1841	Centridini bees

	Centris fuscata Lepeletier, 1841	Centridini bees
	Centris obsoleta Lepeletier, 1841	Centridini bees
	Centris tarsata Smith, 1874	Centridini bees
	Centris trigonoides Lepeletier, 1841	Centridini bees
	Tetragonisca fiebrigi (Schwarz, 1938)	Non-oil-collecting bees
	Trigona spinipes (Fabricius, 1793)	Non-oil-collecting bees
Stigmaphyllon lalandianum A. Juss.	*Centris bicolor* Lepeletier, 1841	Centridini bees
	Centris burgdorfi Friese, 1900	Centridini bees
	Centris collaris Lepeletier, 1841	Centridini bees
	Centris mocsaryi Friese, 1899	Centridini bees
	Centris nitens Lepeletier, 1841	Centridini bees
	Centris rhodoprocta Moure & Seabra, 1960	Centridini bees
	Centris scopipes Friese, 1899	Centridini bees
	Centris similis (Fabricius, 1804)	Centridini bees
	Centris sponsa Smith, 1854	Centridini bees
	Centris tarsata Smith, 1874	Centridini bees
	Centris trigonoides Lepeletier, 1841	Centridini bees
	Epicharis affinis Smith, 1874	Centridini bees
	Epicharis analis Lepeletier, 1841	Centridini bees
	Epicharis flava (Friese, 1900)	Centridini bees
	Epicharis iheringii Friese, 1899	Centridini bees
	Epicharis obscura Friese, 1899	Centridini bees
	Epicharis picta (Smith, 1874)	Centridini bees
	Paratetrapedia velutina (Friese, 1910)	Tapinotaspidini bees
	Tetrapedia diversipes Klug, 1810	Tetrapediini bees
Stigmaphyllon paralias A. Juss.	*Centris aenea* Lepeletier, 1841	Centridini bees
	Centris caxiensis Ducke, 1907	Centridini bees
	Centris flavifrons (Fabricius, 1775)	Centridini bees
	Centris fuscata Lepeletier, 1841	Centridini bees
	Centris leprieuri (Spinola, 1841)	Centridini bees
	Centris sponsa Smith, 1854	Centridini bees
	Epicharis bicolor Smith, 1854	Centridini bees
	Monoeca mourei Aguiar, 2012	Tapinotaspidini bees
	Tropidopedia nigrocarinata Aguiar & Melo, 2007	Tapinotaspidini bees
	Urbanapsis diamantina Aguiar & Melo	Tapinotaspidini bees
Stigmaphyllon tomentosum A.Juss.	*Centris longimana* Fabricius, 1804	Centridini bees
	Centris tarsata Smith, 1874	Centridini bees
Tetrapterys ambigua (A. Juss.) Nied.	*Centris fuscata* Lepeletier, 1841	Centridini bees
	Centris varia (Erichson, 1849)	Centridini bees
Tetrapterys jussieuana Nied.	*Centris fuscata* Lepeletier, 1841	Centridini bees
Tetrapterys phlomoides (Spreng.) Nied.	*Centris bicolor* Lepeletier, 1841	Centridini bees

	Centris collaris Lepeletier, 1841	Centridini bees
	Centris rhodoprocta Moure & Seabra, 1960	Centridini bees
	Centris tarsata Smith, 1874	Centridini bees
	Centris vittata Lepeletier, 1841	Centridini bees
	Epicharis affinis Smith, 1874	Centridini bees
	Epicharis flava (Friese, 1900)	Centridini bees
	Tetrapedia diversipes Klug, 1810	Tetrapediini bees
	Tetrapedia peckoltii Friese, 1899	Tetrapediini bees
Tetrapterys schiedeana Schltdl. & Cham.	*Centris rhodoprocta* Moure & Seabra, 1960	Centridini bees
MELASTOMATACEAE		
Macairea radula (Bonpl.) DC.	*Centris aenea* Lepeletier, 1841	Centridini bees
Mouriri guianensis Aubl.	*Megalopta amoena* (Spinola, 1853)	Non-oil-collecting bees
	Melipona subnitida Ducke, 1910	Non-oil-collecting bees
	Xylocopa cearensis Ducke, 1911	Non-oil-collecting bees
	Xylocopa grisescens Lepeletier, 1841	Non-oil-collecting bees
Mouriri myrtilloides Poir.	*Euglossa imperialis* Cockerell, 1922	Non-oil-collecting bees
	Euglossa tridentata Moure, 1970	Non-oil-collecting bees
	Paratetrapedia calcarata (Cresson, 1878)	Tapinotaspidini bees
	Partamona cupira (Smith, 1863)	Non-oil-collecting bees
	Tetragonisca angustula (Latreille, 1825)	Non-oil-collecting bees
	Trigona pallens (Fabricius, 1798)	Non-oil-collecting bees
Tibouchina cerastifolia Cogn.	*Centris tarsata* Smith, 1874	Centridini bees
ORCHIDACEAE		
Ceratandra grandiflora Lindl.	*Heterochelus podagricus* Fabricius, 1781	Beatle
	Lepithrix hilaris Péringuey, 1902	Beatle
Corycium dracomontanum Parkman & Schelpe	*Rediviva brunnea* Whitehead & Steiner, 2008	Melittinae bees
Corycium orobanchoides (L. f.) Sw.	*Rediviva peringueyi* (Friese, 1911)	Melittinae bees
Disperis bolusiana Schltr.	*Rediviva peringueyi* (Friese, 1911)	Melittinae bees
Gomesa bifolia (Sims) M.W. Chase & N.H. Williams	*Centris trigonoides* Lepeletier, 1841	Centridini bees
Grobya amherstiae Lindl.	*Paratetrapedia fervida* (Smith, 1879)	Tapinotaspidini bees
Huttonaea fimbriata (Harv.) Rchb. f.	*Rediviva brunnea* Whitehead & Steiner, 2008	Melittinae bees
	Rediviva colorata Michener, 1981	Melittinae bees
	Rediviva neliana Cockerell, 1931	Melittinae bees

Huttonaea grandiflora (Schltr.) Rolfe	*Rediviva brunnea* Whitehead & Steiner, 2008	Melittinae bees
	Rediviva neliana Cockerell, 1931	Melittinae bees
Huttonaea pulchra Harv.	*Rediviva brunnea* Whitehead & Steiner, 2008	Melittinae bees
	Rediviva colorata Michener, 1981	Melittinae bees
	Rediviva neliana Cockerell, 1931	Melittinae bees
Pterygodium alatum (Thunb.) Sw.	*Rediviva peringueyi* (Friese, 1911)	Melittinae bees
Pterygodium caffrum (L.) Sw.	*Rediviva peringueyi* (Friese, 1911)	Melittinae bees
Pterygodium catholicum (L.) Sw.	*Rediviva peringueyi* (Friese, 1911)	Melittinae bees
Trichocentrum pumilum (Lindl.) M.W. Chase & N.H. Williams	*Lophopedia nigrispinis* (Vachal, 1909)	Tapinotaspidini bees
	Tetrapedia diversipes Klug, 1810	Tetrapediini bees
Trichocentrum stipitatum (Lindl.) M.W.Chase & N.H.Williams	*Centris longimana* Fabricius, 1804	Centridini bees
	Centris varia (Erichson, 1849)	Centridini bees
	Trigona corvina Cockerell, 1913	Non-oil-collecting bees
	Trigona muzoensis Schwarz, 1948	Non-oil-collecting bees
Zygostates alleniana Kraenzl.	*Lophopedia nigrispinis* (Vachal, 1909)	Tapinotaspidini bees
PLANTAGINACEAE		
Angelonia campestris Nees & Mart.	*Centris xanthomelaena* Moure & Castro, 2001	Centridini bees
	Plebeia mosquito (Smith, 1863)	Non-oil-collecting bees
	Tetrapedia rugulosa Friese, 1899	Tetrapediini bees
	Trigona spinipes (Fabricius, 1793)	Non-oil-collecting bees
Angelonia cornigera Hook.	*Caenonomada unicalcarata* (Ducke, 1908)	Tapinotaspidini bees
	Centris fuscata Lepeletier, 1841	Centridini bees
	Centris hyptidis Ducke, 1908	Centridini bees
Angelonia eriostachys Benth.	*Centris leprieuri* (Spinola, 1841)	Centridini bees
	Tapinotaspis nordestina Roig-Alsina, 2003	Tapinotaspidini bees
	Centris bicolor Lepeletier, 1841	Centridini bees
	Centris burgdorfi Friese, 1900	Centridini bees
Angelonia goyazensis Benth.	*Paratetrapedia punctata* Aguiar & Melo, 2011	Tapinotaspidini bees
	Tetrapedia peckoltii Friese, 1899	Tetrapediini bees
	Centris aenea Lepeletier, 1841	Centridini bees
Angelonia hirta Cham.	*Centris burgdorfi* Friese, 1900	Centridini bees
	Centris klugii Friese, 1899	Centridini bees
	Centris aenea Lepeletier, 1841	Centridini bees
	Centris fuscata Lepeletier, 1841	Centridini bees
	Centris tarsata Smith, 1874	Centridini bees
	Centris trigonoides Lepeletier, 1841	Centridini bees

	Centris xanthomelaena Moure & Castro, 2001	Centridini bees
Angelonia integerrima Spreng.	*Paratetrapedia huberi**	Tapinotaspidini bees
	Tetrapedia rugulosa Friese, 1899	Tetrapediini bees
	Arhysoceble dichroopoda Moure, 1948	Tapinotaspidini bees
	Arhysoceble picta (Friese, 1899)	Tapinotaspidini bees
	Augochlora iphigenia Holmberg, 1886	Non-oil-collecting bees
	Augochlorella ephyra (Schrottky, 1910)	Non-oil-collecting bees
	Centris burgdorfi Friese, 1900	Centridini bees
	Centris discolor Smith, 1874	Centridini bees
	Centris tarsata Smith, 1874	Centridini bees
	Centris tricolor Friese, 1899	Centridini bees
	Centris trigonoides Lepeletier, 1841	Centridini bees
	Centris vulpecula Burmeister, 1876	Centridini bees
	Chalepogenus luciane (Urban, 1996)	Tapinotaspidini bees
	Chalepogenus unicolor Roig-Alsina, 1999	Tapinotaspidini bees
	Lophopedia nigrispinis (Vachal, 1909)	Tapinotaspidini bees
	Mourella caerulea (Friese, 1900)	Non-oil-collecting bees
	Plebeia droryana (Friese, 1900)	Non-oil-collecting bees
	Plebeia emerina (Friese, 1900)	Non-oil-collecting bees
	Trigona spinipes (Fabricius, 1793)	Non-oil-collecting bees
	Eristalinus taeniops Wiedemann, 1818	Fly
	Pirhosigma deforme (Fox, 1899)	Fly
Angelonia pubescens Benth.	*Toxomerus productus* (Curran, 1930)	Fly
	Polybia ignobilis (Haliday, 1836)	Wasp
	Centris hyptidis Ducke, 1908	Centridini bees
	Centris thelyopsis Vivallo & Melo, 2009	Centridini bees
Angelonia salicariifolia Bonpl.	*Paratetrapedia huberi**	Tapinotaspidini bees
	Tetrapedia rugulosa Friese, 1899	Tetrapediini bees
	Caenonomada bruneri Ashmead, 1899	Tapinotaspidini bees
	Caenonomada unicalcarata (Ducke, 1908)	Tapinotaspidini bees
	Centris hyptidoides Roig-Alsina, 2000	Centridini bees
	Centris rhodoprocta Moure & Seabra, 1960	Centridini bees
	Centris tarsata Smith, 1874	Centridini bees
Basistemon silvaticus (Herzog) Baehni & J.F.Macbr.	*Centris trigonoides* Lepeletier, 1841	Centridini bees
	Euglossa annectens Dressier, 1982	Non-oil-collecting bees
	Arhysoceble huberi (Ducke, 1908)	Tapinotaspidini bees
	Caenonomada bruneri Ashmead, 1899	Tapinotaspidini bees

Mecardonia procumbens (Mill.) Small	*Caenonomada unicalcarata* (Ducke, 1908)	Tapinotaspidini bees
	Centris hyptidoides Roig-Alsina, 2000	Centridini bees
	Apis mellifera Linnaeus, 1758	Non-oil-collecting bees
	Augochlora semiramis (Schrottky, 1910)	Non-oil-collecting bees
	Augochloropsis euterpe (Holmberg, 1886)	Non-oil-collecting bees
	Ceratina hyemalis Moure, 1950	Non-oil-collecting bees
	Ceratina muelleri Friese, 1910	Non-oil-collecting bees
	Chalepogenus betinae (Urban, 1995)	Tapinotaspidini bees
	Euglossa mandibularis Friese, 1899	Non-oil-collecting bees
	Hexantheda missionica Ogloblin, 1948	Non-oil-collecting bees
	Paroxystoglossa brachycera Moure, 1960	Non-oil-collecting bees
	Plebeia emerina (Friese, 1900)	Non-oil-collecting bees
	Plebeia remota (Holmberg, 1903)	Non-oil-collecting bees
	Psaenythia bergii Holmberg, 1884	Non-oil-collecting bees
	Psaenythia collaris Schrottky, 1906	Non-oil-collecting bees
Monopera perennis (Hassl.) Barringer	*Pseudagapostemon fluminensis* Schrottky, 1911	Non-oil-collecting bees
	Schwarziana quadripunctata (Lepeletier, 1836)	Non-oil-collecting bees
Monttea aphylla (Miers) Benth. & Hook. f.	*Caenonomada bruneri* Ashmead, 1899	Tapinotaspidini bees
	Caenonomada unicalcarata (Ducke, 1908)	Tapinotaspidini bees
	Apis mellifera Linnaeus, 1758	Non-oil-collecting bees
	Bombus opifex Smith, 1879	Non-oil-collecting bees
	Centris brethesi Schrottky, 1902	Centridini bees
	Centris rhodophthalma Pérez, 1911	Centridini bees
	Centris tricolor Friese, 1899	Centridini bees
	Centris vardyorum Roig-Alsina, 2000	Centridini bees
	*Eupeprina nuda**	Non-oil-collecting bees
Monttea chilensis J.Gay	*Mesonychium jenseni* (Friese, 1906)	Non-oil-collecting bees
	Xylocopa ordinaria Smith, 1874	Non-oil-collecting bees
Monttea schickendantzii Griseb.	*Centris cineraria* Smith, 1854	Centridini bees

	Centris nigerrima (Spinola, 1851)	Centridini bees
PRIMULACEAE		
Lysimachia asperulifolia Poir.	*Bombus opifex* Smith, 1879	Non-oil-collecting bees
	Centris tricolor Friese, 1899	Centridini bees
Lysimachia ciliata L.	*Augochlorella gratiosa* (Smith, 1853)	Non-oil-collecting bees
Lysimachia punctata L.	*Augochlorella striata* (Packer, 1990)	Non-oil-collecting bees
	Macropis nuda (Provancher, 1882)	Non-oil-collecting bees
	Macropis fulvipes (Fabricius, 1804)	Non-oil-collecting bees
SCHROPHULARIACEAE		
Colpias mollis E. Mey. ex Benth.	*Rediviva albifasciata* Whitehead & Steiner, 1994	Melittinae bees
	Rediviva bicava Whitehead & Steiner, 2001	Melittinae bees
Diascia anastrepta Hilliard & B.L. Burtt	*Rediviva neliana* Cockerell, 1931	Melittinae bees
	Rediviva pallidula Whitehead & Steiner, 1992	Melittinae bees
Diascia austromontana KE Steiner	*Rediviva neliana* Cockerell, 1931	Melittinae bees
Diascia barberae Hook. f.	*Rediviva neliana* Cockerell, 1931	Melittinae bees
	Rediviva pallidula Whitehead & Steiner, 1992	Melittinae bees
Diascia capsularis Benth.	*Rediviva neliana* Cockerell, 1931	Melittinae bees
Diascia cardiosepala Hiern	*Patellapis doleritica* Timmermann, 2009	Non-oil-collecting bees
	Rediviva intermixta (Cockerell, 1934)	Melittinae bees
	Rediviva longimanus Michener, 1981	Melittinae bees
	Rediviva macgregori Whitehead & Steiner, 2001	Melittinae bees
	Rediviva nitida Whitehead & Steiner, 2001	Melittinae bees
Diascia cordata N.E. Br.	*Rediviva neliana* Cockerell, 1931	Melittinae bees
Diascia fetcaniensis Hilliard & BL Burtt	*Rediviva neliana* Cockerell, 1931	Melittinae bees
Diascia floribunda K.E. Steiner	*Patellapis doleritica* Timmermann, 2009	Non-oil-collecting bees
	Rediviva intermixta (Cockerell, 1934)	Melittinae bees
	Rediviva longimanus Michener, 1981	Melittinae bees
	Rediviva macgregori Whitehead & Steiner, 2001	Melittinae bees
	Rediviva nitida Whitehead & Steiner, 2001	Melittinae bees
Diascia integerrima E.Mey. ex Benth.	*Rediviva neliana* Cockerell, 1931	Melittinae bees
	Rediviva pallidula Whitehead & Steiner, 1992	Melittinae bees
Diascia longicornis Druce	*Rediviva micheneri* Whitehead & Steiner, 2001	Melittinae bees

Diascia megathura Hilliard & BL Burtt	*Rediviva neliana* Cockerell, 1931	Melittinae bees
Diascia purpurea N.E. Br.	*Rediviva neliana* Cockerell, 1931	Melittinae bees
Diascia rigescens E. Mey. ex Benth.	*Rediviva neliana* Cockerell, 1931	Melittinae bees
Diascia stachyoides Schltr. ex Hiern	*Rediviva neliana* Cockerell, 1931	Melittinae bees
Diascia tugelensis Hilliard & B.L. Burtt	*Rediviva neliana* Cockerell, 1931	Melittinae bees
Diascia vigilis Hilliard & B.L. Burtt	*Rediviva neliana* Cockerell, 1931	Melittinae bees
Hemimeris centrodes Hiern	*Rediviva intermixta* (Cockerell, 1934)	Melittinae bees
Hemimeris racemosa (Houtt.) Merr.	*Rediviva albifasciata* Whitehead & Steiner, 1994	Melittinae bees
	Rediviva bicava Whitehead & Steiner, 2001	Melittinae bees
	Rediviva intermixta (Cockerell, 1934)	Melittinae bees
	Rediviva parva Whitehead & Steiner, 2001	Melittinae bees
	Rediviva peringueyi (Friese, 1911)	Melittinae bees
Hemimeris sabulosa L. f.	*Rediviva parva* Whitehead & Steiner, 2001	Melittinae bees
SOLANACEAE		
Nierembergia aristata D. Don	*Lanthanomelissa goeldiana**	Tapinotaspidini bees
Nierembergia calycina Hook.	*Chalepogenus goeldianus* (Friese, 1899)	Tapinotaspidini bees
	Mourella caerulea (Friese, 1900)	Non-oil-collecting bees
	Paratetrapedia melampoda Moure, 1948	Tapinotaspidini bees
	Rhophitulus guariticola (Schlindwein & Moure, 1998)	Non-oil-collecting bees
Nierembergia linariifolia Graham	*Apis mellifera* Linnaeus, 1758	Non-oil-collecting bees
	Centris geminata Cockerell, 1914	Centridini bees
	Centris tricolor Friese, 1899	Centridini bees
	*Chalepogenus brevipili**	Tapinotaspidini bees
	Chalepogenus nigripes (Friese, 1899)	Tapinotaspidini bees
	Chalepogenus parvus Roig-Alsina, 1997	Tapinotaspidini bees
	*Lanthanomelissa goeldiana**	Tapinotaspidini bees
	Tapinotaspis chalybaea (Friese, 1899)	Tapinotaspidini bees
STILBACEAE		
Bowkeria citrina Thode	*Rediviva rufocincta* (Cockerell, 1934)	Melittinae bees
Bowkeria verticillata Druce	*Rediviva rufocincta* (Cockerell, 1934)	Melittinae bees
Ixianthes retzioides Benth.	*Rediviva gigas* Whitehead & Steiner, 1993	Melittinae bees

* name not found

CONSIDERAÇÕES FINAIS

A compilação de estudos realizada nessa dissertação levantou 204 espécies de flores produtoras de óleo, um baixo número quando comparado com estimativas anteriores. Entretanto, a compilação das interações registradas nos 161 trabalhos revisados permitiu a construção de uma meta-rede de interações de óleo nos biomas mundiais, possibilitando a descrição da estrutura dessa meta-rede de interações e a avaliação dos seus determinantes. Dessa maneira, lança luz não apenas em questões sobre as interações de óleo, como também em meta-redes de interações planta-polinizador em escala geográfica abrangente. Mais além, ao revisar os trabalhos publicados até 2019, notamos uma tendência na abordagem das investigações das interações entre flores produtoras de óleo e seus visitantes florais, além do foco em espécies de Malpighiaceae.

Dessa maneira, esperamos que as descobertas apresentadas aqui inspirem trabalhos futuros a utilizarem diferentes abordagens e focarem em diferentes grupos taxonômicos de flores produtoras de óleo, para um entendimento verdadeiramente global sobre as interações de óleo. Além de colaborar com a literatura incipiente sobre os determinantes de meta-redes de interações planta-polinizador.

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