



Common Hymenoptera of the Greater Metropolitan Area of Costa Rica

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Abstract

The collections of the National Museum of Costa Rica contain a total of 7,895 specimens, corresponding to the Greater Metropolitan Area (GAM) and some peri-urban areas surrounding it. A total of 52 families, 264 genera and 452 species are also recorded, to which another 223 species are added reported in the databases of the Global Biodiversity Information Facility (GBIF), which were corroborated by bibliographic references and witnesses in other collections, for a final count of 674 species.

Keywords: Ants; Bees; Urban Insects; Wasps

Introduction

When I discuss the topic of urban insects with the non-scientific population of a region, it is very common to receive comments of rejection of groups of wasps and ants, as well as fear and curiosity about bees. It is fashionable to integrate some measures in favor of wild insect populations, such as bee hotels, butterfly host plants and trees. But even these concepts only bring to people's minds the image of one or two species of bees, colorful butterflies and little birds, but the reality of the composition of the entomofaunal community of an ecosystem is much more complex.

In Costa Rica, when working with the urban public, I have received comments such as that they have an "ant plague" in their house or garden, or that they have had to call the fire department to burn a wasp or bee hive, with the greatest concern mentioned to me being the safety of children and pets. In addition, environmental education and urban ecology research programs do not have specific information on the taxonomic composition of urban areas, based on which they can develop educational material for the

management and conservation of these specific species that, in the end, remain wild and therefore linked to the current wildlife conservation law.

This article documents the most common species of Hymenoptera in the GAM, considering all families of the order and including only observations from the last 25 years, as well as species that have backup specimens from the National Museum of Costa Rica.

Methodology

Nomenclatures:

MNCR-A: National Museum of Costa Rica, Arthropods collection.

BBSL: Agricultural Research Service, Bee Biology and Systematics Laboratory collection.

CBG: Centre for Biodiversity Genomics

SEMC: Snow Entomological Museum Collection

MNB: Museum für Naturkunde Berlin, Alemania

GBIF: Global Biodiversity Information Facility

Study Area

The list was made within the limits of the Greater Metropolitan Area and a sector of the peri-urban area (Figure 1). All specimens of the order Hymenoptera present in the MNCR collection were considered, as well as the records present in the GBIF database with specimens in BBSL, CBG, SEMC and MNB.

The INaturalist records were excluded because they did

not have specimens in the collection and it is very difficult to validate the identification of the species from photographs, due to the complexity of the taxonomy, but it is not ruled out that many of these observations can be validated in the future. Likewise, the oldest records from the year 2000 were not considered, because the presence of these species cannot be validated today, as the landscape has changed a lot in recent decades.

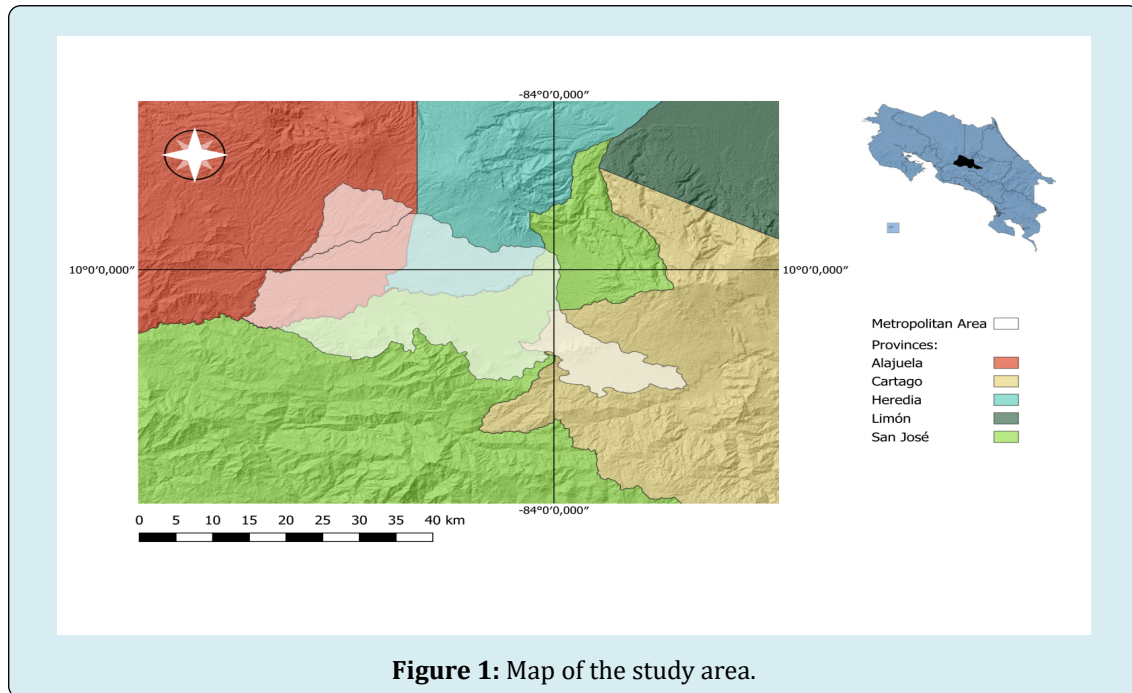


Figure 1: Map of the study area.

Results

Considering the GBIF records and the 7895 specimens

found in the MNCR collection, a total of 674 species were recorded, detailed below:

Familia	Especie	Endemismo	Testigo / Referencia
Agaonidae	<i>Pegoscapus tonduzi</i>	No endemic	Ramírez-Benavides, et al.
Ampulicidae	<i>Ampulex angusticollis</i>	No endemic	MNCR-A 5034806
Andrenidae	<i>Protandrena sp.</i>	No endemic	MNCR-A 66561
Aphelinidae	<i>Aphelinus abdominalis</i>	No endemic	CBG- sin número de catálogo
Apidae	<i>Apis (Apis) mellifera</i>	No endemic	MNCR-A 585457
Apidae	<i>Bombus (Fervidobombus) digressus</i>	No endemic	MNCR-A 4185350
Apidae	<i>Bombus (Fervidobombus) mexicanus</i>	No endemic	MNCR-A 5057936
Apidae	<i>Bombus (Fervidobombus) pullatus</i>	No endemic	MNCR-A 4080181
Apidae	<i>Bombus (Pyrobombus) ephippiatus</i>	No endemic	MNCR-A 5057920
Apidae	<i>Bombus (Robustobombus) volucelloides</i>	No endemic	MNCR-A 4030091
Apidae	<i>Centris (Aphemisia) agiloides</i>	No endemic	BBSL- sin número de catálogo

Apidae	<i>Centris (Centris) adani</i>	No endemic	BBSL- sin número de catálogo
Apidae	<i>Centris (Centris) obscurior</i>	No endemic	BBSL 14873
Apidae	<i>Centris (Centris) varia</i>	No endemic	BBSL 14759
Apidae	<i>Centris (Hemisiella) nitida</i>	No endemic	BBSL 16159
Apidae	<i>Centris (Hemisiella) trigonoides</i>	No endemic	BBSL 16181
Apidae	<i>Centris (Hemisiella) vittata</i>	No endemic	BBSL 15004
Apidae	<i>Centris (Heterocentris) terminata</i>	No endemic	BBSL 16142
Apidae	<i>Centris (Ptilocentris) festiva</i>	No endemic	MNCR-A 5134662
Apidae	<i>Centris (Trachina) fuscata</i>	No endemic	BBSL 16134
Apidae	<i>Centris sp.</i>	No endemic	MNCR-A 1204949
Apidae	<i>Cephalotrigona zexmeniae</i>	No endemic	BBSL 26830
Apidae	<i>Ceratina sp.</i>	Indeterminado	MNCR-A 585668
Apidae	<i>Ceratina (Zadontomerus) ignara</i>	No endemic	BBSL 15081
Apidae	<i>Eufriesea concava</i>	No endemic	MNCR-A 1008036
Apidae	<i>Eufriesea pallida</i>	No endemic	MNCR-A 4336844
Apidae	<i>Eufriesea sp.</i>	No endemic	MNCR-A 4080178
Apidae	<i>Euglossa (Euglossa) deceptrix</i>	No endemic	BBSL 6725
Apidae	<i>Euglossa (Euglossa) dilemma</i>	No endemic	SEMC 152106
Apidae	<i>Euglossa (Euglossa) townsendi</i>	No endemic	MNCR-A 1015959
Apidae	<i>Euglossa (Euglossa) tridentata</i>	No endemic	MNCR-A 4011384
Apidae	<i>Euglossa (Euglossa) variabilis</i>	No endemic	MNCR-A 4262821
Apidae	<i>Euglossa (Euglossa) viridissima</i>	No endemic	MNCR-A 3931166
Apidae	<i>Euglossa (Glossura) imperialis</i>	No endemic	MNCR-A 1008051
Apidae	<i>Euglossa (Glossura) ignita</i>	No endemic	MNCR-A 4353804
Apidae	<i>Euglossa (Glossurella) bursigera</i>	No endemic	MNCR-A 4361266
Apidae	<i>Euglossa (Glossurella) sapphirina</i>	No endemic	MNCR-A 4334053
Apidae	<i>Euglossa sp.</i>	No endemic	MNCR-A 4003911
Apidae	<i>Eulaema (Apeulaema) cingulata</i>	No endemic	MNCR-A 5002352
Apidae	<i>Eulaema (Apeulaema) polychroma</i>	No endemic	MNCR-A 3832020
Apidae	<i>Eulaema (Apeulaema) speciosa</i>	No endemic	MNCR-A 5002213
Apidae	<i>Eulaema (Eulaema) luteola</i>	No endemic	MNCR-A 1008049
Apidae	<i>Eulaema (Eulaema) meriana</i>	No endemic	MNCR-A 4353796
Apidae	<i>Eulaema marcii</i>	No endemic	MNCR-A 4099585
Apidae	<i>Exaerete frontalis</i>	No endemic	MNCR-A 5002463
Apidae	<i>Exaerete smaragdina</i>	No endemic	MNCR-A 979403
Apidae	<i>Exomalopsis (Exomalopsis) badioventris</i>	No endemic	BBSL 22036
Apidae	<i>Exomalopsis (Exomalopsis) fumipennis</i>	No endemic	BBSL 22045
Apidae	<i>Exomalopsis (Exomalopsis) mellipes</i>	No endemic	BBSL 22390
Apidae	<i>Exomalopsis (Exomalopsis) similis</i>	No endemic	BBSL 22059
Apidae	<i>Exomalopsis (Exomalopsis) tepaneca</i>	No endemic	BBSL 22107

Apidae	<i>Florilegus sp.</i>	No endemic	MNCR-A 5002791
Apidae	<i>Geotrigona acapulcornis</i>	No endemic	MNCR-A 5134571
Apidae	<i>Geotrigona lutzi</i>	No endemic	MNCR-A 585478
Apidae	<i>Melipona (Michmelia) costaricensis</i>	No endemic	MNCR-A 4185362
Apidae	<i>Melipona (Melikerria) beecheii</i>	No endemic	BBSL 4502
Apidae	<i>Nannotrigona mellaria</i>	No endemic	MNCR-A 4291012
Apidae	<i>Nannotrigona perilampoides</i>	No endemic	MNCR-A 585672
Apidae	<i>Oxytrigona mellicolor</i>	No endemic	MNCR-A 4353813
Apidae	<i>Paratetrapedia albipes</i>	No endemic	BBSL 8007
Apidae	<i>Paratetrapedia calcarata</i>	No endemic	BBSL 8253
Apidae	<i>Paratetrapedia sp.</i>	Indeterminado	MNCR-A 5134829
Apidae	<i>Partamona orizabaensis</i>	No endemic	MNCR-A 4158334
Apidae	<i>Scaptotrigona pectoralis</i>	No endemic	MNCR-A 4209406
Apidae	<i>Scaptotrigona subobscuripennis</i>	No endemic	MNCR-A 4158342
Apidae	<i>Tetragona dorsalis</i>	No endemic	MNCR-A 5010402
Apidae	<i>Tetragonisca angustula</i>	No endemic	MNCR-A 585663
Apidae	<i>Thygater (Thygater) analis</i>	No endemic	MNCR-A 5002764
Apidae	<i>Thygater sp.</i>	No endemic	MNCR-A 439539
Apidae	<i>Trigona corvina</i>	No endemic	MNCR-A 585460
Apidae	<i>Trigona fulviventris</i>	No endemic	MNCR-A 4353758
Apidae	<i>Trigona nigerrima</i>	No endemic	MNCR-A 4080139
Apidae	<i>Trigona silvestriana</i>	No endemic	MNCR-A 4314850
Apidae	<i>Trigona sp.</i>	No endemic	MNCR-A 5057777
Apidae	<i>Xylocopa sp.</i>	No endemic	MNCR-A 585430
Apidae	<i>Xylocopa tabaniformis</i>	No endemic	MNCR-A 5002789
Argidae	<i>Scobina consobrina</i>	No endemic	MNCR-A 568083
Argidae	<i>Scobina sp.</i>	No endemic	MNCR-A 2307857
Aulacidae	<i>Pristaulacus sp.</i>	Indeterminado	MNCR-A 4016950
Bethylidae	<i>Apenesia sp.</i>	No endemic	MNCR-A 876655
Bethylidae	<i>Dissomphalus sp.</i>	No endemic	MNCR-A 876647
Bethylidae	<i>Pseudisobrachium sp.</i>	No endemic	MNCR-A 876612
Braconidae	<i>Aleiodes alfonsopescadori</i>	Endemic	CBG- sin número de catálogo
Braconidae	<i>Allorhogas ingavera</i>	No endemic	MNCR-A 4096303
Braconidae	<i>Alphomelon disputabile</i>	No endemic	CBG- sin número de catálogo
Braconidae	<i>Alphomelon talidicida</i>	No endemic	CBG- sin número de catálogo
Braconidae	<i>Apanteles alejandromasisi</i>	Endemic	CBG- sin número de catálogo
Braconidae	<i>Apanteles eduardoramirezi</i>	Endemic	CBG- sin número de catálogo
Braconidae	<i>Apanteles galleriae</i>	No endemic	CBG- sin número de catálogo
Braconidae	<i>Apanteles juanlopezi</i>	Endemic	CBG- sin número de catálogo
Braconidae	<i>Apanteles lisabearssae</i>	Endemic	CBG- sin número de catálogo

Braconidae	<i>Apanteles oscarchavezi</i>	Endemic	CBG- sin número de catálogo
Braconidae	<i>Apanteles sp.</i>	No endemic	MNCR-A 585687
Braconidae	<i>Aphidius colemani</i>	No endemic	CBG- sin número de catálogo
Braconidae	<i>Aspilota sp.</i>	No endemic	MNCR-A 876649
Braconidae	<i>Bassus sp.</i>	No endemic	MNCR-A 876595
Braconidae	<i>Bracon eugeniephillipsae</i>	Endemic	CBG- sin número de catálogo
Braconidae	<i>Bracon josejaramilloi</i>	Endemic	CBG- sin número de catálogo
Braconidae	<i>Bracon juliodiazi</i>	Endemic	CBG- sin número de catálogo
Braconidae	<i>Bracon sp.</i>	No endemic	MNCR-A 3764171
Braconidae	<i>Campsobraconoides cinnamomi</i>	No endemic	MNCR-A 4014072
Braconidae	<i>Campsobraconoides sp.</i>	No endemic	MNCR-A 3764170
Braconidae	<i>Chelonus jeremydewaardi</i>	Endemic	CBG- sin número de catálogo
Braconidae	<i>Chelonus jorgebaltodanoi</i>	Endemic	CBG- sin número de catálogo
Braconidae	<i>Chelonus jorgehernandezi</i>	Endemic	CBG- sin número de catálogo
Braconidae	<i>Chelonus marianopereirai</i>	Endemic	CBG- sin número de catálogo
Braconidae	<i>Chelonus maribellealvarezae</i>	Endemic	CBG- sin número de catálogo
Braconidae	<i>Chelonus yeimycedenoae</i>	Endemic	CBG- sin número de catálogo
Braconidae	<i>Chelonus sp.</i>	No endemic	MNCR-A 585692
Braconidae	<i>Compsobraconoides cinnamomi</i>	No endemic	CBG- sin número de catálogo
Braconidae	<i>Diaeretiella rapae</i>	No endemic	CBG- sin número de catálogo
Braconidae	<i>Digonogastra sp.</i>	No endemic	MNCR-A 1015954
Braconidae	<i>Dinotrema sp.</i>	No endemic	MNCR-A 890830
Braconidae	<i>Diospilus sp.</i>	No endemic	MNCR-A 890831
Braconidae	<i>Dolichogenidea sp.</i>	No endemic	MNCR-A 1204806
Braconidae	<i>Eubazus sp.</i>	No endemic	MNCR-A 876604
Braconidae	<i>Glyptapanteles bobkulai</i>	Endemic	CBG- sin número de catálogo
Braconidae	<i>Glyptapanteles daveschindeli</i>	No endemic	CBG- sin número de catálogo
Braconidae	<i>Glyptapanteles donquickei</i>	Endemic	CBG- sin número de catálogo
Braconidae	<i>Glyptapanteles meganmiltonae</i>	Endemic	CBG- sin número de catálogo
Braconidae	<i>Glyptapanteles pamitchellae</i>	Endemic	CBG- sin número de catálogo
Braconidae	<i>Glyptapanteles sondrawardae</i>	Endemic	CBG- sin número de catálogo
Braconidae	<i>Glyptapanteles victoriapookae</i>	Endemic	CBG- sin número de catálogo
Braconidae	<i>Heterospilus sp.</i>	Indeterminado	MNCR-A 876587
Braconidae	<i>Hypomicrogaster koino</i>	No endemic	MNCR-A 4077768
Braconidae	<i>Hormius joncoddingtoni</i>	Endemic	CBG- sin número de catálogo
Braconidae	<i>Hormius mercedesfosterae</i>	Endemic	CBG- sin número de catálogo
Braconidae	<i>Hypomicrogaster zan</i>	No endemic	CBG- sin número de catálogo
Braconidae	<i>Hypomicrogaster zonaria</i>	No endemic	MNCR-A 3166317
Braconidae	<i>Lipolexis oregmae</i>	No endemic	CBG- sin número de catálogo
Braconidae	<i>Lysiphlebus testaceipes</i>	No endemic	CBG- sin número de catálogo

Braconidae	<i>Lytopylus eliethcantillanoae</i>	Endemic	CBG- sin número de catálogo
Braconidae	<i>Meteorus laphygmae</i>	No endemic	CBG- sin número de catálogo
Braconidae	<i>Myosoma sp.</i>	No endemic	MNCR-A 2213991
Braconidae	<i>Neothlipsis bobkulai</i>	Endemic	CBG- sin número de catálogo
Braconidae	<i>Oligoneurus sp.</i>	No endemic	MNCR-A 876608
Braconidae	<i>Opius sp.</i>	No endemic	MNCR-A 585685
Braconidae	<i>Orgilus jimtiedjei</i>	Endemic	CBG- sin número de catálogo
Braconidae	<i>Orgilus larryspearsi</i>	Endemic	CBG- sin número de catálogo
Braconidae	<i>Orgilus richardprimacki</i>	Endemic	CBG- sin número de catálogo
Braconidae	<i>Orgilus sandraberriosae</i>	Endemic	CBG- sin número de catálogo
Braconidae	<i>Phanerotoma anamariamongee</i>	Endemic	CBG- sin número de catálogo
Braconidae	<i>Phanerotoma davesmithi</i>	Endemic	CBG- sin número de catálogo
Braconidae	<i>Phanerotoma dirksteinkei</i>	Endemic	CBG- sin número de catálogo
Braconidae	<i>Psenobolus triangularis</i>	No endemic	MNCR-A 1938848
Braconidae	<i>Pseudapanteles raulsolorzanoi</i>	Endemic	CBG- sin número de catálogo
Braconidae	<i>Pseudophanerotoma bobrobbinsi</i>	Endemic	CBG- sin número de catálogo
Braconidae	<i>Schizoprymnus sp.</i>	No endemic	MNCR-A 5057108
Braconidae	<i>Stantonia luismirandai</i>	Endemic	CBG- sin número de catálogo
Braconidae	<i>Syntretus sp.</i>	No endemic	MNCR-A 876661
Braconidae	<i>Triraphis sp.</i>	No endemic	MNCR-A 876665
Braconidae	<i>Vipio sp.</i>	No endemic	MNCR-A 585459
Chalcididae	<i>Brachymeria sp.</i>	No endemic	MNCR-A 4003815
Chalcididae	<i>Conura femorata</i>	No endemic	MNCR-A 585690
Chalcididae	<i>Conura flava</i>	No endemic	MNCR-A 589993
Chalcididae	<i>Conura transitira</i>	No endemic	MNCR-A 589992
Crabroninae	<i>Crabro sp.</i>	No endemic	MNCR-A 3815875
Chalcididae	<i>Notaspidium sp.</i>	No endemic	MNCR-A 585681
Chrysididae	<i>Holopyga liturata</i>	No endemic	MNCR-A 5006233
Colletidae	<i>Ptiloglossa costaricana</i>	Endemic	MNCR-A 4159368
Colletidae	<i>Ptiloglossa eximia</i>	No endemic	MNCR-A 439540
Colletidae	<i>Ptiloglossa mexicana</i>	No endemic	MNCR-A 2176272
Colletidae	<i>Ptiloglossa sp.</i>	Indeterminado	MNCR-A 5002263
Crabronidae	<i>Rhopalum sp.</i>	No endemic	MNCR-A 2249369
Crabronidae	<i>Rhopalum rumipambae</i>	No endemic	MNCR-A 2249388
Crabronidae	<i>Stigmus sp.</i>	No endemic	MNCR-A 585699
Crabronidae	<i>Trypoxylon duckei</i>	No endemic	CBG- sin número de catálogo
Crabronidae	<i>Trypoxylon posterorubrum</i>	No endemic	CBG- sin número de catálogo
Crabronidae	<i>Trypoxylon rufidens</i>	No endemic	CBG- sin número de catálogo
Diapriidae	<i>Dissoxylabis sp.</i>	No endemic	MNCR-A 876671
Diapriidae	<i>Paramesius sp.</i>	No endemic	MNCR-A 876597

Diapriidae	<i>Pentapria sp.</i>	No endemic	MNCR-A 876646
Diapriidae	<i>Spilomicrus sp.</i>	No endemic	MNCR-A 876570
Diapriidae	<i>Trichopria sp.</i>	No endemic	MNCR-A 876576
Encyrtidae	<i>Anagyrus lizanorum</i>	No endemic	MNCR-A 3752004
Encyrtidae	<i>Copidosoma floridanum</i>	No endemic	CBG- sin número de catálogo
Encyrtidae	<i>Encyrtus infelix</i>	No endemic	CBG- sin número de catálogo
Encyrtidae	<i>Metaphycus lupia</i>	No endemic	MNCR-A 5135799
Encyrtidae	<i>Syrphophagus sp.</i>	No endemic	MNCR-A 876582
Eucharitidae	<i>Orasema sp.</i>	No endemic	MNCR-A 876618
Eulophidae	<i>Achrysocharoides gliricidia</i>	No endemic	MNCR-A 4399399
Eulophidae	<i>Apleurotropis albiscapus</i>	No endemic	MNCR-A 4406433
Eulophidae	<i>Baryscapus sp.</i>	No endemic	MNCR-A 1213232
Eulophidae	<i>Entedononecremnus hansonii</i>	No endemic	MNCR-A 4132363
Eulophidae	<i>Euplectrus valverdei</i>	No endemic	MNCR-A 4132363
Eulophidae	<i>Horismenus sardus</i>	No endemic	MNCR-A 4399356
Eulophidae	<i>Horismenus sp.</i>	No endemic	MNCR-A 876572
Eulophidae	<i>Tetrastichus howardi</i>	No endemic	CBG- sin número de catálogo
Eupelmidae	<i>Arachnophaga rhadinocnemia</i>	No endemic	CBG- sin número de catálogo
Eupelmidae	<i>Brasema rhadinos</i>	No endemic	CBG- sin número de catálogo
Eurytomidae	<i>Eurytoma sp.</i>	No endemic	MNCR-A 585695
Eurytomidae	<i>Neorileyia sp.</i>	No endemic	MNCR-A 3705044
Eurytomidae	<i>Sycophila sp.</i>	No endemic	MNCR-A 3705148
Evaniidae	<i>Evania albofacialis</i>	No endemic	CBG- sin número de catálogo
Evaniidae	<i>Evaniella sp.</i>	No endemic	MNCR-A 2615780
Figitidae	<i>Acanthaegilips brazilensis</i>	No endemic	CBG- sin número de catálogo
Figitidae	<i>Neralsia sp.</i>	No endemic	MNCR-A 890896
Formicidae	<i>Acanthoponera minor</i>	No endemic	MNCR-A 1091497
Formicidae	<i>Acanthoponera minor</i>	No endemic	GBIF
Formicidae	<i>Acromyrmex echinatior</i>	No endemic	CAS- sin número de catálogo
Formicidae	<i>Acromyrmex octospinosus</i>	No endemic	MNCR-A 1091497
Formicidae	<i>Acromyrmex sp.</i>	No endemic	MNCR-A 5057395
Formicidae	<i>Acropyga keira</i>	No endemic	GBIF
Formicidae	<i>Acropyga palaga</i>	No endemic	GBIF
Formicidae	<i>Acropyga smithii</i>	No endemic	MNCR-A 4267041
Formicidae	<i>Adelomyrmex silvestrii</i>	No endemic	MNCR-A 4267041
Formicidae	<i>Adelomyrmex tristani</i>	No endemic	MNCR-A 4265690
Formicidae	<i>Anochetus diegensis</i>	No endemic	MNCR-A 4266471
Formicidae	<i>Anochetus sp.</i>	No endemic	MNCR-A 5057401
Formicidae	<i>Anochetus striatulus</i>	No endemic	MNCR-A 1091509
Formicidae	<i>Aphaenogaster sp.</i>	No endemic	MNCR-A 5057418

Formicidae	<i>Apterostigma pilosum</i>	No endemic	MNCR-A 1091509
Formicidae	<i>Atta cephalotes</i>	No endemic	MNCR-A 1091302
Formicidae	<i>Azteca alfari</i>	No endemic	CAS- sin número de catálogo
Formicidae	<i>Azteca constructor</i>	No endemic	CAS- sin número de catálogo
Formicidae	<i>Brachymyrmex heeri</i>	No endemic	MNCR-A 4266272
Formicidae	<i>Brachymyrmex musculus</i>	No endemic	CAS- sin número de catálogo
Formicidae	<i>Brachymyrmex nebulosus</i>	No endemic	GBIF
Formicidae	<i>Camponotus atriceps</i>	No endemic	MNCR-A 1091175
Formicidae	<i>Camponotus claviscapus</i>	No endemic	CAS- sin número de catálogo
Formicidae	<i>Camponotus conspicuus</i>	No endemic	MNCR-A 4178768
Formicidae	<i>Camponotus cuneidorsus</i>	No endemic	CAS- sin número de catálogo
Formicidae	<i>Camponotus novogranadensis</i>	No endemic	MNCR-A 4265744
Formicidae	<i>Camponotus planatus</i>	No endemic	MNCR-A 3849708
Formicidae	<i>Camponotus sericeiventris</i>	No endemic	MNCR-A 1015900
Formicidae	<i>Camponotus striatus</i>	No endemic	CAS- sin número de catálogo
Formicidae	<i>Camponotus zonatus</i>	No endemic	GBIF
Formicidae	<i>Carebarella bicolor</i>	No endemic	CAS- sin número de catálogo
Formicidae	<i>Carebara inca</i>	No endemic	GBIF
Formicidae	<i>Carebara urichi</i>	No endemic	MNCR-A 4265661
Formicidae	<i>Cephalotes basalis</i>	No endemic	MNCR-A 4285455
Formicidae	<i>Cephalotes maculatus</i>	No endemic	MNCR-A 979423
Formicidae	<i>Cephalotes umbraculatus</i>	No endemic	MNCR-A 4285457
Formicidae	<i>Crematogaster curvispinosa</i>	No endemic	MNCR-A 4267115
Formicidae	<i>Crematogaster torosa</i>	No endemic	CAS- sin número de catálogo
Formicidae	<i>Crematogaster sumichrasti</i>	No endemic	MNCR-A 3849709
Formicidae	<i>Crematogaster torosa</i>	No endemic	MNCR-A 979421
Formicidae	<i>Cylindromyrmex escobari</i>	No endemic	GBIF
Formicidae	<i>Cylindromyrmex whympersi</i>	No endemic	GBIF
Formicidae	<i>Cyphomyrmex rimosus</i>	No endemic	MNCR-A 4265772
Formicidae	<i>Cyphomyrmex salvini</i>	No endemic	MNCR-A 4265685
Formicidae	<i>Discothyrea horni</i>	No endemic	MNCR-A 4265759
Formicidae	<i>Eciton sp.</i>	No endemic	MNCR-A 4170971
Formicidae	<i>Eciton vagans</i>	No endemic	MNCR-A 4011723
Formicidae	<i>Ectatomma edentatum</i>	No endemic	MNCR-A 4227576
Formicidae	<i>Ectatomma tuberculatum</i>	No endemic	MNCR-A 4227576
Formicidae	<i>Gnamptogenys regularis</i>	No endemic	MNCR-A 4266984
Formicidae	<i>Gnamptogenys stellae</i>	No endemic	GBIF
Formicidae	<i>Gnamptogenys strigata</i>	No endemic	MNCR-A 4167707
Formicidae	<i>Gnamptogenys volcano</i>	No endemic	GBIF
Formicidae	<i>Gnamptogenys wheeleri</i>	No endemic	MNCR-A 4266316

Formicidae	<i>Holcaponera striatula</i>	No endemic	GBIF
Formicidae	<i>Holcaponera strigata</i>	No endemic	GBIF
Formicidae	<i>Hypoconera nitidula</i>	No endemic	MNCR-A 4265768
Formicidae	<i>Hypoconera opacior</i>	No endemic	MNCR-A 4266393
Formicidae	<i>Hypoconera parva</i>	No endemic	MNCR-A 4266491
Formicidae	<i>Hypoconera sp.</i>	No endemic	MNCR-A 4266742
Formicidae	<i>Lenomyrmex colwelli</i>	No endemic	GBIF
Formicidae	<i>Linepithema angulatum</i>	No endemic	MNCR-A 4266859
Formicidae	<i>Linepithema iniquum</i>	No endemic	CAS- sin número de catálogo
Formicidae	<i>Linepithema neotropicum</i>	No endemic	CAS- sin número de catálogo
Formicidae	<i>Mycetosoritis vinsoni</i>	No endemic	GBIF
Formicidae	<i>Myrmelachista zeledoni</i>	No endemic	CAS- sin número de catálogo
Formicidae	<i>Neivamyrmex spoliator</i>	No endemic	MNCR-A 4170857
Formicidae	<i>Neoponera verena</i>	No endemic	CAS- sin número de catálogo
Formicidae	<i>Nesomyrmex dalmasi</i>	No endemic	GBIF
Formicidae	<i>Nesomyrmex vargasi</i>	No endemic	GBIF
Formicidae	<i>Nylanderia steinheili</i>	No endemic	CAS- sin número de catálogo
Formicidae	<i>Octostruma balzani complex</i>	No endemic	MNCR-A 4267107
Formicidae	<i>Odontomachus sp.</i>	No endemic	MNCR-A 5134638
Formicidae	<i>Odontomachus laticeps</i>	No endemic	MNCR-A 1091409
Formicidae	<i>Odontomachus meinerti</i>	No endemic	MNCR-A 4265742
Formicidae	<i>Odontomachus minutus</i>	No endemic	GBIF
Formicidae	<i>Pachycondyla aenescens</i>	No endemic	MNCR-A 4160198
Formicidae	<i>Pachycondyla dismarginata</i>	No endemic	GBIF
Formicidae	<i>Pachycondyla harpax</i>	No endemic	MNCR-A 4265658
Formicidae	<i>Pachycondyla impressa</i>	No endemic	MNCR-A 979402
Formicidae	<i>Pachycondyla insignis</i>	No endemic	GBIF
Formicidae	<i>Pachycondyla lineaticeps</i>	No endemic	MNCR-A 3849674
Formicidae	<i>Pachycondyla transversa</i>	No endemic	GBIF
Formicidae	<i>Paratrechina longicornis</i>	No endemic	CBG- sin número de catálogo
Formicidae	<i>Paratrechina steinheili</i>	No endemic	MNCR-A 4265673
Formicidae	<i>Pheidole absurda</i>	No endemic	MNCR-A 4266000
Formicidae	<i>Pheidole beloceps</i>	No endemic	MNCR-A 4266000
Formicidae	<i>Pheidole bilimeki</i>	No endemic	CAS- sin número de catálogo
Formicidae	<i>Pheidole nitella</i>	No endemic	MNCR-A 4266524
Formicidae	<i>Pheidole potosiana</i>	No endemic	MNCR-A 4265745
Formicidae	<i>Pheidole radoszkowskii</i>	No endemic	MNCR-A 3849714
Formicidae	<i>Pheidole sagittaria</i>	No endemic	MNCR-A 4266986
Formicidae	<i>Pheidole scitula</i>	No endemic	GBIF
Formicidae	<i>Pheidole shine</i>	No endemic	GBIF

Formicidae	<i>Pheidole tiny</i>	No endemic	GBIF
Formicidae	<i>Pheidole variegata</i>	No endemic	GBIF
Formicidae	<i>Proceratium convexiceps</i>	No endemic	GBIF
Formicidae	<i>Proceratium panamense</i>	No endemic	GBIF
Formicidae	<i>Procryptocerus impressus</i>	No endemic	GBIF
Formicidae	<i>Procryptocerus batesi</i>	No endemic	GBIF
Formicidae	<i>Procryptocerus impressus</i>	No endemic	GBIF
Formicidae	<i>Procryptocerus kempfi</i>	No endemic	GBIF
Formicidae	<i>Procryptocerus nalini</i>	No endemic	GBIF
Formicidae	<i>Procryptocerus tortuguero</i>	Endemic	GBIF
Formicidae	<i>Pseudomyrmex fortis</i>	No endemic	GBIF
Formicidae	<i>Pseudomyrmex nigrocinctus</i>	No endemic	GBIF
Formicidae	<i>Rogeria cornuta</i>	No endemic	GBIF
Formicidae	<i>Rogeria neilyensis</i>	Endemic	GBIF
Formicidae	<i>Rogeria terescandens</i>	Endemic	GBIF
Formicidae	<i>Solenopsis diplothropum</i>	No endemic	GBIF
Formicidae	<i>Solenopsis geminata</i>	No endemic	MNCR-A 4185277
Formicidae	<i>Solenopsis sp.</i>	No endemic	MNCR-A 585669
Formicidae	<i>Stenammas sp.</i>	Indeterminado	GBIF
Formicidae	<i>Strumigenys augustandrewi</i>	Endemic	GBIF
Formicidae	<i>Strumigenys calamita</i>	Endemic	GBIF
Formicidae	<i>Strumigenys cascanteae</i>	Endemic	GBIF
Formicidae	<i>Strumigenys cremata</i>	No endemic	GBIF
Formicidae	<i>Strumigenys deletrix</i>	No endemic	GBIF
Formicidae	<i>Strumigenys dontopagis</i>	No endemic	GBIF
Formicidae	<i>Strumigenys dubitata</i>	Endemic	GBIF
Formicidae	<i>Strumigenys erickae</i>	Endemic	GBIF
Formicidae	<i>Strumigenys extirpa</i>	No endemic	GBIF
Formicidae	<i>Strumigenys idiogenes</i>	Endemic	GBIF
Formicidae	<i>Strumigenys lalassa</i>	No endemic	GBIF
Formicidae	<i>Strumigenys longinoi</i>	Endemic	GBIF
Formicidae	<i>Strumigenys nastata</i>	Endemic	GBIF
Formicidae	<i>Strumigenys oconitilloae</i>	No endemic	GBIF
Formicidae	<i>Strumigenys paniaguae</i>	No endemic	GBIF
Formicidae	<i>Strumigenys paradoxa</i>	No endemic	GBIF
Formicidae	<i>Strumigenys parsauga</i>	No endemic	GBIF
Formicidae	<i>Strumigenys pasisops</i>	Endemic	GBIF
Formicidae	<i>Strumigenys platyscapa</i>	No endemic	GBIF
Formicidae	<i>Strumigenys rogata</i>	No endemic	GBIF
Formicidae	<i>Strumigenys sevesta</i>	No endemic	GBIF

Formicidae	<i>Strumigenys stauroma</i>	No endemic	GBIF
Formicidae	<i>Strumigenys turpis</i>	No endemic	GBIF
Formicidae	<i>Strumigenys warditeras</i>	Endemic	GBIF
Formicidae	<i>Cephalotes cristatus</i>	No endemic	GBIF
Formicidae	<i>Cephalotes minutus</i>	No endemic	GBIF
Formicidae	<i>Cephalotes multispinosus</i>	No endemic	GBIF
Gasteruptiidae	<i>Gasteruption kaweahense</i>	No endemic	MNCR-A 3379366
Gasteruptiidae	<i>Gasteruption sp.</i>	Indeterminado	MNCR-A 4016945
Halictidae	<i>Agapostemon sp.</i>	No endemic	MNCR-A 296607
Halictidae	<i>Augochlora sp.</i>	Indeterminado	MNCR-A 585670
Halictidae	<i>Augochloropsis sp.</i>	Indeterminado	MNCR-A 3815922
Halictidae	<i>Caenaugochlora sp.</i>	Indeterminado	MNCR-A 590031
Halictidae	<i>Pseudaugochlora sp.</i>	No endemic	MNCR-A 4158189
Halictidae	<i>Sphecodes sp.</i>	Indeterminado	MNCR-A 4167560
Halictidae	<i>Temnosoma sp.</i>	No endemic	MNCR-A 4167560
Ichneumonidae	<i>Acrotaphus chedelae</i>	No endemic	MNCR-A 1101687
Ichneumonidae	<i>Agonocryptus sp.</i>	No endemic	MNCR-A 3139634
Ichneumonidae	<i>Amblyteles sp.</i>	No endemic	MNCR-A 460865
Ichneumonidae	<i>Anastelgis garciai</i>	Endemic	MNCR-A 4332701
Ichneumonidae	<i>Anastelgis jaramilloi</i>	Endemic	MNCR-A 4184329
Ichneumonidae	<i>Anomalon canoae</i>	Endemic	MNCR-A 876675
Ichneumonidae	<i>Anomalon didii</i>	Endemic	GBIF
Ichneumonidae	<i>Anomalon fuscipes</i>	No endemic	MNCR-A 2516530
Ichneumonidae	<i>Anomalon sp.</i>	Indeterminado	MNCR-A 2543174
Ichneumonidae	<i>Apechthis zapoteca</i>	No endemic	MNCR-A 1095962
Ichneumonidae	<i>Apechoneura naturaeconservatio</i>	No endemic	GBIF
Ichneumonidae	<i>Apechoneura zuniga</i>	Endemic	GBIF
Ichneumonidae	<i>Asthenara donlonae</i>	No endemic	MNCR-A 1123469
Ichneumonidae	<i>Baryceros mirabilis</i>	No endemic	MNCR-A 4083883
Ichneumonidae	<i>Baryceros sp.</i>	No endemic	MNCR-A 3134842
Ichneumonidae	<i>Brachycyrtus oculatus</i>	No endemic	MNCR-A 4005845
Ichneumonidae	<i>Brachycyrtus pretiosus</i>	No endemic	MNCR-A 3134833
Ichneumonidae	<i>Calliephialtes sp.</i>	No endemic	GBIF
Ichneumonidae	<i>Campsocryptus sp.</i>	No endemic	MNCR-A 3139601
Ichneumonidae	<i>Carinodes sp.</i>	No endemic	MNCR-A 1116376
Ichneumonidae	<i>Casinaria sp.</i>	No endemic	MNCR-A 1293392
Ichneumonidae	<i>Certonotus maculata</i>	No endemic	GBIF
Ichneumonidae	<i>Certonotus nigricornis</i>	No endemic	GBIF
Ichneumonidae	<i>Certonotus tricoloripes</i>	No endemic	GBIF
Ichneumonidae	<i>Cestrus sp.</i>	No endemic	MNCR-A 1112006

Ichneumonidae	<i>Chiloplatys mexicanus</i>	No endemic	MNCR-A 1123484
Ichneumonidae	<i>Clistopyga eldae</i>	Endemic	MNCR-A 1123320
Ichneumonidae	<i>Clistopyga fernandesi</i>	Endemic	MNCR-A 4332747
Ichneumonidae	<i>Clistopyga henryi</i>	Endemic	MNCR-A 1123322
Ichneumonidae	<i>Coccygomimus sp.</i>	No endemic	MNCR-A 5002930
Ichneumonidae	<i>Coelichneumon</i>	No endemic	MNCR-A 3139585
Ichneumonidae	<i>Cordeleboea nigrata</i>	Endemic	MNCR-A 1123322
Ichneumonidae	<i>Cratichneumon sp.</i>	No endemic	MNCR-A 3135856
Ichneumonidae	<i>Cryptanura sp.</i>	No endemic	MNCR-A 3135575
Ichneumonidae	<i>Cryptopyge pulchripennis</i>	No endemic	GBIF
Ichneumonidae	<i>Cylloceria alvaradoi</i>	Endemic	MNCR-A 1123322
Ichneumonidae	<i>Diapetimorpha sp.</i>	No endemic	MNCR-A 2600052
Ichneumonidae	<i>Digonocryptus sp.</i>	No endemic	MNCR-A 3135983
Ichneumonidae	<i>Diplazon laetatorius</i>	No endemic	MNCR-A 3139615
Ichneumonidae	<i>Diradops carinata</i>	No endemic	GBIF
Ichneumonidae	<i>Diradops diora</i>	Endemic	MNCR-A 1146301
Ichneumonidae	<i>Diradops gonida</i>	No endemic	GBIF
Ichneumonidae	<i>Diradops keila</i>	No endemic	GBIF
Ichneumonidae	<i>Diradops lareta</i>	No endemic	GBIF
Ichneumonidae	<i>Diradops mexicana</i>	No endemic	MNCR-A 85423
Ichneumonidae	<i>Diradops nishidai</i>	Endemic	MNCR-A 1106375
Ichneumonidae	<i>Diradops robusta</i>	Endemic	GBIF
Ichneumonidae	<i>Diradops tamaska</i>	Endemic	MNCR-A 1146300
Ichneumonidae	<i>Diradops upanga</i>	Endemic	GBIF
Ichneumonidae	<i>Diradops viola</i>	Endemic	GBIF
Ichneumonidae	<i>Diradops yovera</i>	Endemic	MNCR-A 1106337
Ichneumonidae	<i>Diradops zootita</i>	Endemic	MNCR-A 1146289
Ichneumonidae	<i>Dolichomitus annulicornis</i>	No endemic	MNCR-A 1110490
Ichneumonidae	<i>Dolichomitus flacissimus</i>	Endemic	MNCR-A 1123894
Ichneumonidae	<i>Dusona sp.</i>	Indeterminado	MNCR-A 3135573
Ichneumonidae	<i>Eiphosoma macrum</i>	No endemic	MNCR-A 4350095
Ichneumonidae	<i>Eiphosoma sp.</i>	Indeterminado	MNCR-A 2543297
Ichneumonidae	<i>Enicospilus sp.</i>	No endemic	MNCR-A 1008087
Ichneumonidae	<i>Enizemum fallasi</i>	Endemic	GBIF
Ichneumonidae	<i>Epelaspis sp.</i>	No endemic	MNCR-A 876601
Ichneumonidae	<i>Epirhyssa oranensis</i>	No endemic	MNCR-A 1100814
Ichneumonidae	<i>Epirhyssa praecincta</i>	No endemic	MNCR-A 1100806
Ichneumonidae	<i>Eruga obandoi</i>	Endemic	GBIF
Ichneumonidae	<i>Eruga yehi</i>	Endemic	MNCR-A 1123357
Ichneumonidae	<i>Eutanygaster sp.</i>	No endemic	MNCR-A 2543304

Ichneumonidae	<i>Exetastes agnostus</i>	No endemic	GBIF
Ichneumonidae	<i>Exetastes tarsalis</i>	No endemic	MNCR-A 1109572
Ichneumonidae	<i>Exetastes venius</i>	No endemic	GBIF
Ichneumonidae	<i>Exetastes vittatipes</i>	No endemic	MNCR-A 1113654
Ichneumonidae	<i>Exochus pubitus</i>	No endemic	MNCR-A 2543169
Ichneumonidae	<i>Exochus spinalis</i>	No endemic	MNCR-A 3135950
Ichneumonidae	<i>Exochus womus</i>	No endemic	MNCR-A 2543170
Ichneumonidae	<i>Ganodes matai</i>	Endemic	MNCR-A 1100801
Ichneumonidae	<i>Grotea djinnae</i>	No endemic	MNCR-A 3139976
Ichneumonidae	<i>Grotea vanessae</i>	Endemic	MNCR-A 3139637
Ichneumonidae	<i>Hadrostethus eberhardi</i>	No endemic	MNCR-A 1106443
Ichneumonidae	<i>Hapsinotus glissatus</i>	No endemic	GBIF
Ichneumonidae	<i>Hymenoepimecis sp.</i>	No endemic	MNCR-A 5002935
Ichneumonidae	<i>Hyposoter sp.</i>	No endemic	MNCR-A 3134834
Ichneumonidae	<i>Ichneumon sp.</i>	No endemic	MNCR-A 3140044
Ichneumonidae	<i>Iseropus sp.</i>	No endemic	GBIF
Ichneumonidae	<i>Itamoplex albitarsis</i>	No endemic	GBIF
Ichneumonidae	<i>Joppocryptus sp.</i>	No endemic	MNCR-A 3135959
Ichneumonidae	<i>Labena gloriosa</i>	No endemic	MNCR-A 4003855
Ichneumonidae	<i>Lamprocryptidea sp.</i>	No endemic	MNCR-A 3138211
Ichneumonidae	<i>Lamprocryptus sp.</i>	No endemic	MNCR-A 3135973
Ichneumonidae	<i>Lanugo sp.</i>	No endemic	MNCR-A 4350089
Ichneumonidae	<i>Lathrolestes haroldi</i>	No endemic	MNCR-A 1149635
Ichneumonidae	<i>Leurus caeruliventris</i>	No endemic	MNCR-A 66562
Ichneumonidae	<i>Lissocaulus emaceratus</i>	No endemic	MNCR-A 1109716
Ichneumonidae	<i>Lissonota bebela</i>	No endemic	MNCR-A 3944470
Ichneumonidae	<i>Lissonota begaza</i>	No endemic	GBIF
Ichneumonidae	<i>Lissonota crudeta</i>	Endemic	MNCR-A 1113766
Ichneumonidae	<i>Lissonota horpa</i>	Endemic	MNCR-A 1123301
Ichneumonidae	<i>Lissonota leucopoda</i>	No endemic	MNCR-A 1106451
Ichneumonidae	<i>Lissonota pseudeleboea</i>	No endemic	MNCR-A 1109613
Ichneumonidae	<i>Lissonota sp.</i>	Indeterminado	MNCR-A 2248986
Ichneumonidae	<i>Listrodromus sp.</i>	No endemic	MNCR-A 3134816
Ichneumonidae	<i>Loxodocus pallidus</i>	No endemic	MNCR-A 1106505
Ichneumonidae	<i>Loxodocus sp.</i>	Indeterminado	MNCR-A 1106506
Ichneumonidae	<i>Lycorina apicalis</i>	No endemic	MNCR-A 4353874
Ichneumonidae	<i>Lymeon sp.</i>	No endemic	MNCR-A 3135968
Ichneumonidae	<i>Macrojoppa sp.</i>	No endemic	MNCR-A 3135576
Ichneumonidae	<i>Melanocryptus sp.</i>	No endemic	MNCR-A 3135960
Ichneumonidae	<i>Meniscomorpha elizondoii</i>	No endemic	MNCR-A 4353874

Ichneumonidae	<i>Meniscomorpha helpsina</i>	Endemic	MNCR-A 1106388
Ichneumonidae	<i>Meniscomorpha hembra</i>	Endemic	MNCR-A 1106414
Ichneumonidae	<i>Meniscomorpha pensita</i>	Endemic	MNCR-A 1106385
Ichneumonidae	<i>Meniscomorpha romata</i>	Endemic	MNCR-A 85741
Ichneumonidae	<i>Meniscomorpha sotoi</i>	Endemic	MNCR-A 1146319
Ichneumonidae	<i>Meniscomorpha xerasha</i>	Endemic	MNCR-A 1109777
Ichneumonidae	<i>Meniscomorpha yoventa</i>	Endemic	MNCR-A 1123282
Ichneumonidae	<i>Meniscomorpha zacasta</i>	Endemic	MNCR-A 1123282
Ichneumonidae	<i>Mesochorus arcuatus</i>	No endemic	GBIF
Ichneumonidae	<i>Mesochorus hiemalis</i>	No endemic	GBIF
Ichneumonidae	<i>Messatoporus sp.</i>	No endemic	MNCR-A 3134815
Ichneumonidae	<i>Metiopijs amenus</i>	Endemic	GBIF
Ichneumonidae	<i>Metiopijs dolenus</i>	Endemic	GBIF
Ichneumonidae	<i>Metiopijs halorus</i>	Endemic	GBIF
Ichneumonidae	<i>Metiopijs pelus</i>	Endemic	GBIF
Ichneumonidae	<i>Metiopijs quambus</i>	Endemic	GBIF
Ichneumonidae	<i>Microcharops sp.</i>	No endemic	MNCR-A 3134835
Ichneumonidae	<i>Mnioes erythropoda</i>	No endemic	MNCR-A 1106545
Ichneumonidae	<i>Mnioes jucundus</i>	No endemic	MNCR-A 1106545
Ichneumonidae	<i>Mnioes leucozona</i>	No endemic	MNCR-A 2249167
Ichneumonidae	<i>Mnioes nalbes</i>	No endemic	MNCR-A 2248987
Ichneumonidae	<i>Mnioes sp.</i>	Indeterminado	MNCR-A 2248976
Ichneumonidae	<i>Neotheronia abramsae</i>	Endemic	MNCR-A 1101981
Ichneumonidae	<i>Neotheronia concolor</i>	No endemic	MNCR-A 1110771
Ichneumonidae	<i>Neotheronia holmae</i>	Endemic	MNCR-A 1102013
Ichneumonidae	<i>Neotheronia lizae</i>	Endemic	MNCR-A 1102134
Ichneumonidae	<i>Neotheronia mellosa</i>	No endemic	MNCR-A 2516601
Ichneumonidae	<i>Neotheronia mexicana</i>	No endemic	GBIF
Ichneumonidae	<i>Neotheronia montezuma</i>	No endemic	MNCR-A 2516601
Ichneumonidae	<i>Neotheronia nigrolineata</i>	No endemic	MNCR-A 1110816
Ichneumonidae	<i>Neotheronia sp.</i>	Indeterminado	MNCR-A 3135835
Ichneumonidae	<i>Netelia gray</i>	No endemic	GBIF
Ichneumonidae	<i>Nonnus sp.</i>	No endemic	MNCR-A 3134818
Ichneumonidae	<i>Oceta jereza</i>	Endemic	GBIF
Ichneumonidae	<i>Oedemopsis guemadoi</i>	Endemic	GBIF
Ichneumonidae	<i>Oedicephalus sp.</i>	No endemic	MNCR-A 3135577
Ichneumonidae	<i>Ophion sp.</i>	No endemic	MNCR-A 4184912
Ichneumonidae	<i>Parania pizarroi</i>	Endemic	MNCR-A 3140052
Ichneumonidae	<i>Periceros humos</i>	Endemic	GBIF
Ichneumonidae	<i>Periceros secos</i>	Endemic	GBIF

Ichneumonidae	<i>Phobetes guilleini</i>	Endemic	MNCR-A 3140052
Ichneumonidae	<i>Phobetes maltezi</i>	Endemic	MNCR-A 1123475
Ichneumonidae	<i>Phytodietus (Neuchorus) maximoi</i>	Endemic	MNCR-A 1123493
Ichneumonidae	<i>Phytodietus adriani</i>	Endemic	GBIF
Ichneumonidae	<i>Phytodietus sylviae</i>	Endemic	MNCR-A 4158480
Ichneumonidae	<i>Pimpla caeruleata</i>	No endemic	MNCR-A 4158480
Ichneumonidae	<i>Pimpla croceipes</i>	No endemic	MNCR-A 1110532
Ichneumonidae	<i>Pimpla croceiventris</i>	No endemic	MNCR-A 1149466
Ichneumonidae	<i>Pimpla ichneumoniformis</i>	No endemic	MNCR-A 1149466
Ichneumonidae	<i>Pimpla perssoni</i>	Endemic	MNCR-A 1149466
Ichneumonidae	<i>Pimpla punicipes</i>	No endemic	MNCR-A 1015966
Ichneumonidae	<i>Pimpla rojasi</i>	Endemic	MNCR-A 4322797
Ichneumonidae	<i>Pimpla sumichrasti</i>	No endemic	MNCR-A 1149774
Ichneumonidae	<i>Pimpla sp.</i>	Indeterminado	MNCR-A 2543293
Ichneumonidae	<i>Podeleboea altissima</i>	Endemic	MNCR-A 85768
Ichneumonidae	<i>Polycyrtus alexisi</i>	Endemic	MNCR-A 3891608
Ichneumonidae	<i>Polycyrtus elviae</i>	Endemic	MNCR-A 3891381
Ichneumonidae	<i>Polycyrtus infractus</i>	No endemic	MNCR-A 3891382
Ichneumonidae	<i>Polycyrtus lindhae</i>	Endemic	MNCR-A 3891577
Ichneumonidae	<i>Polycyrtus melanoleucus</i>	No endemic	MNCR-A 3135971
Ichneumonidae	<i>Polycyrtus obtusispina</i>	No endemic	MNCR-A 3891300
Ichneumonidae	<i>Polycyrtus pallidibalteatus</i>	No endemic	MNCR-A 3891330
Ichneumonidae	<i>Polycyrtus sp.</i>	Indeterminado	MNCR-A 2599296
Ichneumonidae	<i>Polysphincta purcelli</i>	Endemic	MNCR-A 1102302
Ichneumonidae	<i>Pristomerus sp.</i>	Indeterminado	MNCR-A 2543299
Ichneumonidae	<i>Ptychopsis glabrata</i>	No endemic	GBIF
Ichneumonidae	<i>Rhabdotus sp.</i>	No endemic	MNCR-A 3135840
Ichneumonidae	<i>Quillonota pitillai</i>	Endemic	GBIF
Ichneumonidae	<i>Scambus basseyi</i>	Endemic	MNCR-A 1102324
Ichneumonidae	<i>Scambus espinozai</i>	No endemic	MNCR-A 1102324
Ichneumonidae	<i>Scambus yalileae</i>	No endemic	MNCR-A 3139602
Ichneumonidae	<i>Scambus zunigai</i>	Endemic	GBIF
Ichneumonidae	<i>Sphelodon phoxopteridis</i>	No endemic	MNCR-A 3134832
Ichneumonidae	<i>Stethantyx altamira</i>	Endemic	GBIF
Ichneumonidae	<i>Stethantyx cartagoa</i>	Endemic	GBIF
Ichneumonidae	<i>Stethantyx cecilia</i>	Endemic	GBIF
Ichneumonidae	<i>Stethantyx limona</i>	Endemic	GBIF
Ichneumonidae	<i>Stethantyx nigrofemorata</i>	Endemic	GBIF
Ichneumonidae	<i>Stethantyx pseudoosa</i>	Endemic	GBIF
Ichneumonidae	<i>Stethantyx tenoriosa</i>	Endemic	GBIF

Ichneumonidae	<i>Sussaba callosa</i>	No endemic	MNCR-A 3134832
Ichneumonidae	<i>Syzeuctus besamis</i>	No endemic	MNCR-A 85837
Ichneumonidae	<i>Syzeuctus hezonicus</i>	Endemic	MNCR-A 1146276
Ichneumonidae	<i>Ticapimpla valerae</i>	Endemic	GBIF
Ichneumonidae	<i>Theronia sp.</i>	No endemic	MNCR-A 5002939
Ichneumonidae	<i>Trathala aelena.</i>	Endemic	GBIF
Ichneumonidae	<i>Trathala oliva</i>	Endemic	GBIF
Ichneumonidae	<i>Triclistus xodius</i>	Endemic	MNCR-A 3135871
Ichneumonidae	<i>Tricyphus respinozai</i>	Endemic	GBIF
Ichneumonidae	<i>Tromatobia blancoi</i>	Endemic	MNCR-A 1102334
Ichneumonidae	<i>Tromatobia zunigai</i>	Endemic	MNCR-A 1123406
Ichneumonidae	<i>Wahlamia anasiphila</i>	No endemic	GBIF
Ichneumonidae	<i>Wahlamia incompleta</i>	No endemic	GBIF
Ichneumonidae	<i>Woldstedtius callosa</i>	No endemic	GBIF
Ichneumonidae	<i>Xiphosomella sp.</i>	Indeterminado	MNCR-A 3140014
Ichneumonidae	<i>Xorides humos</i>	Endemic	MNCR-A 4273051
Ichneumonidae	<i>Xorides secos</i>	Endemic	MNCR-A 2543160
Ichneumonidae	<i>Xorides yamai</i>	No endemic	MNCR-A 2543160
Ichneumonidae	<i>Zaglyptus chaconi</i>	Endemic	GBIF
Ichneumonidae	<i>Zaglyptus pictilis</i>	No endemic	MNCR-A 2543160
Ichneumonidae	<i>Zaglyptus simonis</i>	No endemic	MNCR-A 2543298
Ichneumonidae	<i>Zaglyptus zulaya</i>	Endemic	GBIF
Ichneumonidae	<i>Zaglytomorpha albopicta</i>	No endemic	GBIF
Ichneumonidae	<i>Zaglytomorpha alinae</i>	Endemic	GBIF
Ichneumonidae	<i>Zaglytomorpha auxiliadora</i>	Endemic	GBIF
Ichneumonidae	<i>Zaglytomorpha bella</i>	Endemic	GBIF
Ichneumonidae	<i>Zaglytomorpha betilafea</i>	Endemic	GBIF
Ichneumonidae	<i>Zaglytomorpha cornuta</i>	Endemic	MNCR-A 2543298
Ichneumonidae	<i>Zaglytomorpha betilafea</i>	Endemic	GBIF
Ichneumonidae	<i>Zaglytomorpha daschi</i>	Endemic	GBIF
Ichneumonidae	<i>Zaglytomorpha flaquis</i>	Endemic	GBIF
Ichneumonidae	<i>Zaglytomorpha gabrieli</i>	Endemic	GBIF
Ichneumonidae	<i>Zaglytomorpha gauldi</i>	Endemic	GBIF
Ichneumonidae	<i>Zaglytomorpha hansonii</i>	Endemic	GBIF
Ichneumonidae	<i>Zaglytomorpha hebeae</i>	Endemic	GBIF
Ichneumonidae	<i>Zaglytomorpha lorraineae</i>	Endemic	GBIF
Ichneumonidae	<i>Zaglytomorpha metafurva</i>	Endemic	GBIF
Ichneumonidae	<i>Zaglytomorpha minuta</i>	Endemic	GBIF
Ichneumonidae	<i>Zaglytomorpha mitchellae</i>	Endemic	GBIF
Ichneumonidae	<i>Zaglytomorpha nigra</i>	Endemic	GBIF

Ichneumonidae	<i>Zaglytomorpha niloi</i>	Endemic	GBIF
Ichneumonidae	<i>Zaglytomorpha obscura</i>	Endemic	GBIF
Ichneumonidae	<i>Zaglytomorpha pediflava</i>	Endemic	GBIF
Ichneumonidae	<i>Zaglytomorpha sinocornis</i>	Endemic	GBIF
Ichneumonidae	<i>Zaglytomorpha ventura</i>	Endemic	GBIF
Ichneumonidae	<i>Zatypota alborhombarta</i>	No endemic	MNCR-A 1102399
Ichneumonidae	<i>Zatypota gerardoii</i>	Endemic	GBIF
Ichneumonidae	<i>Zatypota hansonii</i>	Endemic	GBIF
Ichneumonidae	<i>Zatypota petronae</i>	Endemic	MNCR-A 3134840
Ichneumonidae	<i>Zatypota solanoi</i>	Endemic	MNCR-A 3134840
Ichneumonidae	<i>Zonopimpla atriceps</i>	No endemic	MNCR-A 3135842
Ichneumonidae	<i>Zonopimpla hebeae</i>	Endemic	MNCR-A 4159065
Ichneumoninae	<i>Conopyge sp.</i>	No endemic	MNCR-A 3134828
Megachilidae	<i>Megachile sp.</i>	Indeterminado	MNCR-A 3930962
Mutillidae	<i>Dasymutilla araneoides</i>	No endemic	MNCR-A 1115922
Mutillidae	<i>Dasymutilla iztapa</i>	No endemic	MNCR-A 1090109
Mutillidae	<i>Dasymutilla pulchra</i>	No endemic	MNCR-A 1090109
Mutillidae	<i>Dasymutilla sp.</i>	No endemic	MNCR-A 3815883
Mutillidae	<i>Ephuta sp.</i>	No endemic	MNCR-A 4159137
Mutillidae	<i>Hoplognathoca costarricensis</i>	No endemic	MNCR-A 4158233
Mutillidae	<i>Pertyella sp.</i>	No endemic	MNCR-A 3503508
Mutillidae	<i>Pseudomethoca areta</i>	No endemic	MNCR-A 2499585
Mutillidae	<i>Pseudomethoca chontalensis</i>	No endemic	MNCR-A 2499584
Mutillidae	<i>Pseudomethoca hecate</i>	No endemic	MNCR-A 4158864
Mutillidae	<i>Pseudomethoca robinsonii</i>	No endemic	MNCR-A 4178924
Mutillidae	<i>Pseudomethoca sp.</i>	No endemic	MNCR-A 1090072
Mutillidae	<i>Pseudomethoca verticalis</i>	No endemic	MNCR-A 1015955
Mutillidae	<i>Pseudomethoca willei</i>	No endemic	MNCR-A 457126
Mutillidae	<i>Sphaerophthalma alsvid</i>	No endemic	MNCR-A 4170878
Mutillidae	<i>Timulla derelicta</i>	No endemic	MNCR-A 1115494
Mutillidae	<i>Timulla porcata</i>	No endemic	MNCR-A 2213992
Mutillidae	<i>Timulla sp.</i>	No endemic	MNCR-A 3891771
Mutillidae	<i>Timulla taygete</i>	No endemic	MNCR-A 4199999
Pelecinidae	<i>Pelecinus polyturator</i>	No endemic	MNCR-A 4158295
Pompilidae	<i>Anoplius sp.</i>	No endemic	MNCR-A 590034
Pompilidae	<i>Auplopus sp.</i>	No endemic	MNCR-A 1090936
Pompilidae	<i>Episyron sp.</i>	No endemic	MNCR-A 585524
Pompilidae	<i>Pepsis sp.</i>	No endemic	MNCR-A 5134680
Pteromalidae	<i>Apsilocera sp.</i>	No endemic	MNCR-A 890885
Pteromalidae	<i>Cecidellis inflativena</i>	No endemic	MNCR-A 4130168

Pteromalidae	<i>Eurydinoteloides sp.</i>	No endemic	MNCR-A 1931797
Pteromalidae	<i>Gastrancistrus sp.</i>	No endemic	MNCR-A 890887
Pteromalidae	<i>Halticoptera sp.</i>	No endemic	MNCR-A 66556
Pteromalidae	<i>Lelaps sp.</i>	No endemic	MNCR-A 876621
Pteromalidae	<i>Pachyneuron sp.</i>	No endemic	MNCR-A 1812187
Pteromalidae	<i>Polstonia sp.</i>	No endemic	MNCR-A 890822
Pteromalidae	<i>Proshizonotus sp.</i>	No endemic	MNCR-A 3719258
Pteromalidae	<i>Pteromalus sp.</i>	No endemic	MNCR-A 1114450
Scelionidae	<i>Idris sp.</i>	No endemic	MNCR-A 890836
Scelionidae	<i>Oethecoctonus sp.</i>	No endemic	MNCR-A 876613
Scelionidae	<i>Telenomus sp.</i>	No endemic	MNCR-A 876632
Scelionidae	<i>Trimorus sp.</i>	No endemic	MNCR-A 876568
Sclerogibbidae	<i>Probethylus sp.</i>	No endemic	MNCR-A 4016946
Scoliidae	<i>Campsomeris (Stygocampsomeris) servillei</i>	No endemic	MNCR-A 4107307
Scoliidae	<i>Campsomeris sp.</i>	No endemic	MNCR-A 585431
Scoliidae	<i>Caribanteris sp.</i>	No endemic	MNCR-A 1116192
Sphecidae	<i>Ammophila sp.</i>	No endemic	MNCR-A 585474
Sphecidae	<i>Chalybion sp.</i>	No endemic	MNCR-A 5002991
Sphecidae	<i>Podium sp.</i>	No endemic	MNCR-A 3815879
Sphecidae	<i>Prionyx sp.</i>	No endemic	MNCR-A 585473
Sphecidae	<i>Sphex ichneumoneus</i>	No endemic	MNCR-A 3031017
Sphecidae	<i>Sphex nitidiventris</i>	No endemic	MNCR-A 3031020
Stephanidae	<i>Megischus sp.</i>	No endemic	MNCR-A 4178925
Tenthredinidae	<i>Waldheimia imitatrix</i>	No endemic	MNCR-A 457113
Tiphiidae	<i>Aelurus septentrionalis</i>	No endemic	MNCR-A 4159142
Tiphiidae	<i>Myzinum sp.</i>	No endemic	MNCR-A 66567
Tiphiidae	<i>Tiphia sp.</i>	No endemic	MNCR-A 1111523
Torymidae	<i>Podagrion mantis</i>	No endemic	MNCR-A 3728369
Torymidae	<i>Torymus sp.</i>	No endemic	MNCR-A 876662
Vespidae	<i>Agelaia areata</i>	No endemic	MNCR-A 3815937
Vespidae	<i>Agelaia centralis</i>	No endemic	MNCR-A 3373635
Vespidae	<i>Agelaia myrmecophila</i>	No endemic	MNCR-A 1293369
Vespidae	<i>Agelaia panamensis</i>	No endemic	MNCR-A 5134753
Vespidae	<i>Agelaia sp.</i>	No endemic	MNCR-A 3373717
Vespidae	<i>Agelaia xanthopus melanotica</i>	No endemic	MNCR-A 3373702
Vespidae	<i>Agelaia yepocapa</i>	No endemic	MNCR-A 5135565
Vespidae	<i>Brachygastra smithii</i>	No endemic	MNCR-A 3815925
Vespidae	<i>Epipona sp.</i>	No endemic	MNCR-A 5001810
Vespidae	<i>Mischocyttarus angulatus angulatus</i>	No endemic	MNCR-A 3373636
Vespidae	<i>Mischocyttarus costaricensis</i>	No endemic	MNCR-A 3373714

Vespidae	<i>Mischocyttarus immarginatus</i>	No endemic	MNCR-A 3373714
Vespidae	<i>Mischocyttarus pallidipectus</i>	No endemic	MNCR-A 3373714
Vespidae	<i>Nectarinella championi</i>	No endemic	MNCR-A 4185695
Vespidae	<i>Omicron sp.</i>	No endemic	MNCR-A 1093228
Vespidae	<i>Pachodynerus sp.</i>	No endemic	MNCR-A 4198857
Vespidae	<i>Parachartergus apicalis</i>	No endemic	MNCR-A 3373629
Vespidae	<i>Parachartergus sp.</i>	No endemic	MNCR-A 5001880
Vespidae	<i>Polistes erythrocephalus</i>	No endemic	MNCR-A 1094298
Vespidae	<i>Polistes instabilis</i>	No endemic	MNCR-A 1094611
Vespidae	<i>Polistes sp.</i>	No endemic	MNCR-A 5001926
Vespidae	<i>Polybia belemensis</i>	No endemic	MNCR-A 1015979
Vespidae	<i>Polybia bifasciata</i>	No endemic	MNCR-A 5140966
Vespidae	<i>Polybia bribri</i>	Endemic	MNCR-A 5140966
Vespidae	<i>Polybia diguetana</i>	No endemic	MNCR-A 1094744
Vespidae	<i>Polybia occidentalis</i>	No endemic	MNCR-A 5140968
Vespidae	<i>Polybia raii raii</i>	No endemic	MNCR-A 1093234
Vespidae	<i>Polybia rejecta</i>	No endemic	MNCR-A 1093234
Vespidae	<i>Polybia sp.</i>	No endemic	MNCR-A 3375997
Vespidae	<i>Protopolybia sp.</i>	No endemic	MNCR-A 4366803
Vespidae	<i>Stelopolybia sp.</i>	No endemic	MNCR-A 5001898
Vespidae	<i>Stenodynerus sp.</i>	No endemic	MNCR-A 2024002
Vespidae	<i>Stenosigma sp.</i>	No endemic	MNCR-A 5134665
Vespidae	<i>Zethus sp.</i>	No endemic	MNCR-A 5135590

Table 1: Hymenoptera species of the GAM.

Discussion

Over the last few decades we have seen a significant increase in publications related to a decline in insect species, but few of them really have a monitoring-type backing to demonstrate the decline process. For this, two important pieces of information are necessary: a list of species carried out in an exhaustive manner through monitoring, which is truly representative of the geographic area in question, and a cover study that shows that between two different points in time there was a process of loss of vegetation cover.

In this regard, the GAM of Costa Rica does not have either of these two elements to really define whether there has been a displacement of species due to urban growth, especially since many restoration, conservation and protection projects of vegetation cover have been developed in many areas. Given this uncertainty, the first step in this matter that can be provided is a list of species reported to date, based on which other ecological studies can base their identification and either add species or confirm their presence and absence in

the study.

However, since this list included species supported by other collections, and reports from other researchers for which the specimen is not available to corroborate its identification, the following measures were taken:

Regarding Endemism

Within the Apidae and Halictidae families there are several specimens identified at the genus level, but it is important to emphasize that within these groups there are endemic species to which these specimens could belong; for example, for Apidae, there are specimens of bees belonging to the genus *Ceratina* Latreille, 1802, which has 18 species in the country, 5 of them endemic, namely: *C. fumipennis*, *C. singularis*, *C. aeneiceps*, *C. claripennis* and *C. abdominalis*, so it is not possible to define their endemism.

A similar case occurs for the following genera *Paratetrapedia* Moure, 1941, which has seven species

reported for Costa Rica, within which *P. albilabris* is endemic; For the Halictidae family, the Augochlora genus Smith, 1853 presents 14 for Costa Rica, three of which are endemic: *A. obscuriceps*, *A. fulgidiana* and *A. fulvilabris*; the Augochloropsis genus Cockerell, 1897 presents five species reported for the territory, three of which are endemic: *A. cyanescens*, *A. johanna* and *A. pallitarsis*. Caenaugochlora Michener, 1954 presents seven species reported for the territory, four of which are endemic: *C. costaricensis*, *C. leoi*, *C. beethoveni* and *C. donna*.

There is also the case of the Sphecodes genus Latreille, 1804, which presents only two species reported for Costa Rica: *S. aeneiceps* and *S. clupeatu*, both endemic; However, it is a group with so few serious studies that it should not be determined as endemic without an identification at the species level because there is no in-depth review that rules out the presence in the territory of other species reported for Central America that would not be endemic and are already suspected to be present due to their distribution ranges.

Regarding Data Extracted from GBIF

Since this catalogue contains species data extracted from GBIF online databases, it is important to point out the following cases regarding this data:

- There are 44 specimens identified as *Partamona cupira* (Smith, 1863) reported for Costa Rica; however, this species is endemic to Brazil, so the identification is erroneous [1-3].
- In BBSL there are 25 specimens of *Paratetrapedia albipes* Friese, 1916, which is a synonym of the species *Lophopedia pygmaea* (Schrottky, 1902).
- Since it is evident that the identifications have not been reviewed and updated, records prior to the year 2000 were omitted, because the physical changes in the GAM have been significant in recent years, in terms of habitat loss, so it cannot be corroborated without a witness specimen that the species continues in the area and has not been displaced to peri-urban areas outside the study polygon, to which is added that many of them are identified as species that do not correspond to the indicated distribution, which makes the identification unreliable, and it is necessary to corroborate the specimen.
- All observations that do not have a specimen from the collection were omitted, because it is not scientifically correct to use this type of records for the following reasons: the data in the photograph or the data provided may be altered, the person making the identification may be wrong and there is no specimen with which to corroborate the information.
- The species *Ancyloscelis apiformis* (Fabricius, 1793) was not added because, although Costa Rica is within

its range of distribution, there is no way to verify its identification.

- The species *Anthophorula parva* (Timberlake, 1980) (Andrenidae), is not included in the official catalogue of Neotropical species, and in other taxonomic portals such as Ecdysis, it is recorded for the United States and Mexico.
- The species of the *Centris* genus (Apidae) were taken into account, because their biology and distribution is quite wide, and they were already reported for Costa Rica.
- The *Ceratina (Zadontomerus) ignara* (Apidae) was included because it is supported by the MNB, corresponding to a Syntype collected in the province of San José and is also supported by the article by Flores-Gómez, et al. [4]
- The species of the families Eupelmidae, Evaniidae, Figitidae, Encyrtidae, Crabronidae, Braconidae and Ichneumonidae collected between 2000 and 2020 were included because they were supported by the CBG and the scientists: D. Janzen, W. Hallwachs, R. Zuniga, A. Telfer, K. Perez and R. Miskie, and also by scientific publications [5-8].
- The records of Formicidae, also collected between 2000 and 2020, were also included because of their support by the scientists P.S. Ward and J. Longino, as well as the Antweb platform that has continuous and updated support and review.
- The species *Cephalotrigona zexmeniae* and *Melipona (Melikerria) beecheii* (Apidae) and the two species of the genus *Paratetrapedia* were included because their distribution does fit with that established in the literature.
- The five species of the genus *Exomalopsis* (Apidae) were included, because their biology and nesting requirements can effectively allow viable populations at present [9,10].
- The genus *Calliephialtes* Ashmead, 1900 (Ichneumonidae) appears three times with “f”, “q” and “zz” instead of the species name, so it was only counted once as “*Calliephialtes* sp.”
- The species “*Clistopyga k*” (Ichneumonidae) from GBIF was omitted, because it is not a valid species and 3 valid species of this genus are already reported with a control specimen in the MNCR collection.
- The name *Procryptocerus carbonarius laeviventris* Forel, 1899 is a synonym of *Procryptocerus batesi* Forel, 1899.
- The genus *Pyramica* Roger, 1862 is a synonym of *Strumigenys* Smith, 1860.
- The name *Pseudomyrmex alfari* Forel, 1906 is a synonym of *Pseudomyrmex nigrocinctus* (Emery, 1890).
- The genus *Zacryptocerus* Wheeler, 1911 is a synonym of *Cephalotes* Latreille, 1802.

Conclusions

1. This list may increase as other species reported before 2000 can be confirmed in the study area, proving that they are still there, since due to urban expansion it is very possible that many have been displaced.
2. This is only a preliminary reference list, it may vary over time and due to the extension of the GAM, not all species may be present throughout its territory, but rather there may be differences in altitudinal and latitudinal distribution.
3. It is also concluded that there may be many species that have not yet been fully recorded, because sampling would require entering private properties, which makes the work very difficult, so as it is a preliminary list it should not be taken as an absolute basis but as a reference to know which species are confirmed for the region.
4. By omitting observations without taxonomic support, the risk of including misidentified taxa was minimized; Likewise, it is concluded that the records of digital platforms may not be up to date, so it is recommended to be very cautious regarding their use, since the older the data, the less reliable the identifications are, especially when there is no physical copy to confirm or correct them.

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