Taxonomic revision of the robber-fly genus *Acronyches* Williston, 1908

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Introduction

Assassin flies are aggressive aerial predators that wait and ambush their prey in flight. Using a sharp proboscis the assassin fly pierces its prey and injects it with paralyzing saliva that also breaks down and liquefies its prey. *Acronyches* is a genus of assassin fly found from northern Mexico to southern Paraguay, but specimens are collected rarely.

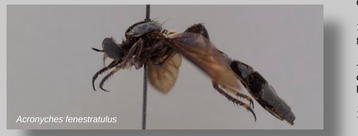
Our study is aimed at making new information available as the last reviews of these large flies were published in the late 1960s and early 1970s (Martin 1968, Papavero 1971). Since then new material has accumulated in many natural history collections extending the known range of several species and also including potentially new species, which we are studying with particular attention. This revision is based on external morphological features of 38 adult flies. All 10 currently recognized species are re-described based on a more extensive list of features as previously used and the new species are scientifically described. A dichotomous key for their identification was developed.

Key to species


Acronyches rarus


Acronyches maya


Acronyches plutactipes


Acronyches fenestratulus


Acronyches westcotti

1 Body mostly grey to dark grey/brown **4**

- Body mostly light brown to light yellow **2**

2 Primarily light yellow abdomen ***A. geosarginus***

- Primarily brown abdomen **3**

3 Primarily brown to dark brown abdomen with light brown border on distal end of tergites, wings entirely hyaline ***A. imitator***

- Primarily brown abdomen, with yellow triangles on lateral sides of T1-T4. Wings patterned with dark and light brown areas ***A. rarus***

4 Wing with pattern, some darker and lighter areas between and throughout wing cells **5**

- Wing without pattern, wings primarily a single color, some lighter areas but no pattern discernable **6**

5 Abdomen long and thin, about as thick as the legs. Wing hyaline on proximal end, with brown blotch covering ⅔ of r1, r3,r5,d, m3 cells, rest of the wing stained light brown. Abdomen dark grey with light brown on distal end of tergites. ***A. alexanderi***

- Abdomen thicker and more robust, larger than legs **7**

6 Wing primarily dark brown, some hyaline areas within cells. Primarily dark grey robust fly. Some light grey triangles on tergites. Proximal end of femur light brown, rest dark brown ***A. maya***

- Wing primarily light brown. Tibia and femur also primarily brown **8**

7 npl. spal and pal seta yellow. Abdomen dark grey with light brown on distal border of T2-4. Tibia and Femur brown ***A. meruuna***

- Tibia and femur different colors, some yellow and black coloration and proximal and distal ends of tibia and femur **9**

8 Tibia and Femur light brown. Wing Veins light brown. Distal ends of tarsus bordered by dark brown. ***A. sp.nov. Panama***

- Tibia and femur dark brown **10**

9 Tibia and Femur primarily light brown. Some dark brown on ventral side of met tibia. T2 is yellow, T3 has dark grey coloration and T4-T7 are grey, all with light brown borders in distal end. ***A. plutactipes***

- Tibia and femur patterned with some black and yellow areas found on the proximal or distal ends of tibia and femur. **11**

10 Tibia and Femur dark brown. Wings Hyaline with brown wing venation. Abdomen dark grey with light brown borders on distal end of T3-5. ***A. willistoni***

-Tibia and Femur dark brown. Wings primarily hyaline with some brown wing venation. Femur dark brown, becomes lighter brown at distal end. Tarsomeres brown and bordered by dark brown at the distal end. **A. flavipennis**

11 Femur dark brown to black, tibia primarily yellow, with some black coloration **12**

- Femur black, Tibia primarily brown to black, some yellow coloration **13**

12 Femur black and densely setose. Tibia primarily yellow, proximal 1/3 black with distal end black. Tarsomeres black. ***A. fenestratulus***

- Femur dark brown. Tibia primarily yellow, apical 1/3 brown. Tarsomeres distal border dark brown. ***A. sp. nov. tikal***

13 Femur dark brown. Tibia primarily dark brown, proximal 1/3 yellow. Wing patterned, primarily light brown, darker areas between C and Sc veins, opaque blotch crossing r, br, bm cells, large opaque blotch size between r5,r3, r1 varies ***A. westcotti***

- Femur dark brown to black. Tibia primarily dark brown to black. Proximal end yellow. Yellow triangles on T2-T4 on lateral side of abdomen. ***A. sp. nov. rondonia***

New Species


Acronyches sp.nov. rondonia

Country: Brazil
Locality: Fazendia Rancho Grande, Rondonia
Date collected: November 12, 1991

Acronyches sp. nov. rondonia has some unique characters that distinguish it from congeners such as the unique pubescence coloration found on the scutum. The scutum is predominantly light grey, with a thick light grey stripe that runs along the scutum medially and terminates between the supra alar and post alar setae and is paralleled by thick dark grey strips that meet where the medial stripe ends and terminates at the scutellum. In addition the abdominal tergites have yellow triangles that start half through the tergite and end at the distal border. The legs of *A. sp. nov. rondonia* are also quite unique, the femur is black while the tibia is mostly yellow with a black stripe on the anterior side, and the hind tibia is black with the proximal apex yellow.


Acronyches sp.nov. tikal

Country: Guatemala
Locality: Ruinas Tikal, Peten
Date collected: July 10th, 1977

Acronyches sp. nov. tikal has a unique pubescence on the scutum that sets it apart from congeners. Like many *Acronyches*, *A. sp. nov. tikal* scutum is light grey pubescent but it has a thick light grey stripe that runs along the medial line, it is also bordered by thick dark brown stripes that meet where the medial stripe ends and continues onward to the scutllum. The tibiae are primarily light brown, with brown anterior stripes, the hind tibia is primarily yellow with the proximal 1/3 being brown. The tergites are predominantly dark grey, the 2nd tergite is light grey with a dark grey medial line visible only when the specimen is view from the posterior, this stripe is not seen on any other species. In addition tergites 2-4 have light grey triangles on the lateral side that start half way through the tergite and stop at the distal border.


Acronyches sp.nov. panama

Country: Panama
Locality: Barro Colorado Island, Canal Zone
Date: July 7th, 1979

Acronyches sp. nov. panama has hyaline wings with yellow veins and other unique characters distinguish it from congeners. A. sp. nov. panama also has a uniquely colored postpronotal lobe which is dark grey with yellow pubescence, this is a unique combination not found in other species. In addition the coloration of the hind femur is unique, it starts off brown and fades to light yellow at the distal end, with the distal apex having a brown band. The abdomen is also unique with tergites 3-7 primarily a dark grey but with light grey bands at the distal ends.

Materials

Specimens used in this revision were either part of the National Museum of Natural History, Washington, D.C. (USNM) collection or loaned from the following institutions: AMNH- American Museum of Natural History, New York City; CNC-Canadian National Collection of Insects, Arachnids and Nematodes, Ottawa, Canada; EMF-Coll. Fisher, El Dorado Hills, CA; FSCA- Florida State Collection of Arthropods, Gainsville, FL; INBIO-Instituto Nacional de Biodiversidad, Costa Rica; INPA-Instituto Nacional de Pesquisas de Amazonia, Manaus, Amazonas, Brazil; TAMU – Texas A& M University, College Station, TX; UCDC- University of California Davis Collection, Davis, CA; UNAM-Universidad Nacional Autónoma de México, Mexico City, MX; ZMHB - Museum für Naturkunde, Berlin, Germany

Methods

We used Lucid Builder and a character matrix of 776 features to enter information for each species. From this matrix, natural-language species descriptions will be exported. Whole habitus photographs of pinned specimens were taken with a Visionary Digital Passport II system (base and StackShot only), an Olympus E-30 digital SLR, a 50 mm macro lens (equivalent of 100 mm focal length in 35 mm photography), and a 25 mm extension tube. The specimens were illuminated by a Falcon FLDM-i200 LED dome-light for even and soft light. Adobe DNG-format images were stacked using HeliconFocus software. Each specimen was data based in a FileMaker Pro database and assigned a unique specimen number (either an institutional number, if available, or an AAM-XXXXXX number used in the Dikow laboratory) and geo-referenced with Google Earth. The occurrence of all species is illustrated in distribution maps plotted with SimpleMappr.

Conclusion

The taxonomic revision of *Acronyches* is still ongoing, in particular new descriptions are needed for those species for which the type specimens did not arrive in time for the revision (material from two German and one Brazilian collection). In addition, other material is known to be deposited in INBio in Costa Rica and the Florida State Collection of Arthropods in Gainesville, FL, which we need to study. Dissections of male and female terminalia are also needed in order to strengthen the distinctions between species. Based on the morphological evidence and the specimens at hand we discovered 4 new species from Panama, Brazil, Mexico and Guatemala. Most of the species found in Central America are located within a biodiversity hotspot known as the Mesoamerican hotspot. This area has been designated as a biodiversity hotspot due the large diversity of flora and fauna found in this area. 7 species of *Acronyches* are found in this hotspot: *A. westcotti*, *A. rarus*, *A. maya*, *A.sp. nov. tikal*, *A. sp.*, *A. sp. nov. panama* and *A. plutactipes*. In addition 3 species are found in the biodiversity hotspot known as the Atlantic forest these include *A. alexanderi*, *A. fenestratulus*, *A. meruuna*. Additional species occur in the biodiversity hotspots known as Cerrrado these include *A. sp. nov. rondonia and A. imitator*. Interestingly *A. fenestratulus* also occurs in the hotspot known as the tropical Andes. The only species that does not occur in biodiversity hotspots are *A. geosarginus* and *A. sp. nov. manaus*, although the areas they are found in have not been declared biodiversity hotspots they still are very diverse.

With the Acronyches range extending throughout areas with poor sampling, such as Brazil, Suriname, Colombia, Venezuela and Guyana, it is most likely that more species in this genus exist in the wild. In the future with more sampling efforts in Central and South America new species could be discovered increasing our knowledge of robber fly diversity.

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