

Deciphering the Diversity and Evolutionary History of Asiloidea Flies

Apioceridae



Apiocera alleni © Greg Ballmer

Asilidae



Efferia sp.

Mydidae



Eremomidas arabicus © Drew Gardner

Torsten Dikow

Biodiversity Synthesis Center, Field Museum of Natural History, Chicago, IL, USA

Taxonomic Revisions

- ◇ discovering and describing new species
- ◇ re-describing previously known species
- ◇ distribution
- ◇ morphology
- ◇ *e.g.*, 9 revisions, 122 species revised, 58 new species described

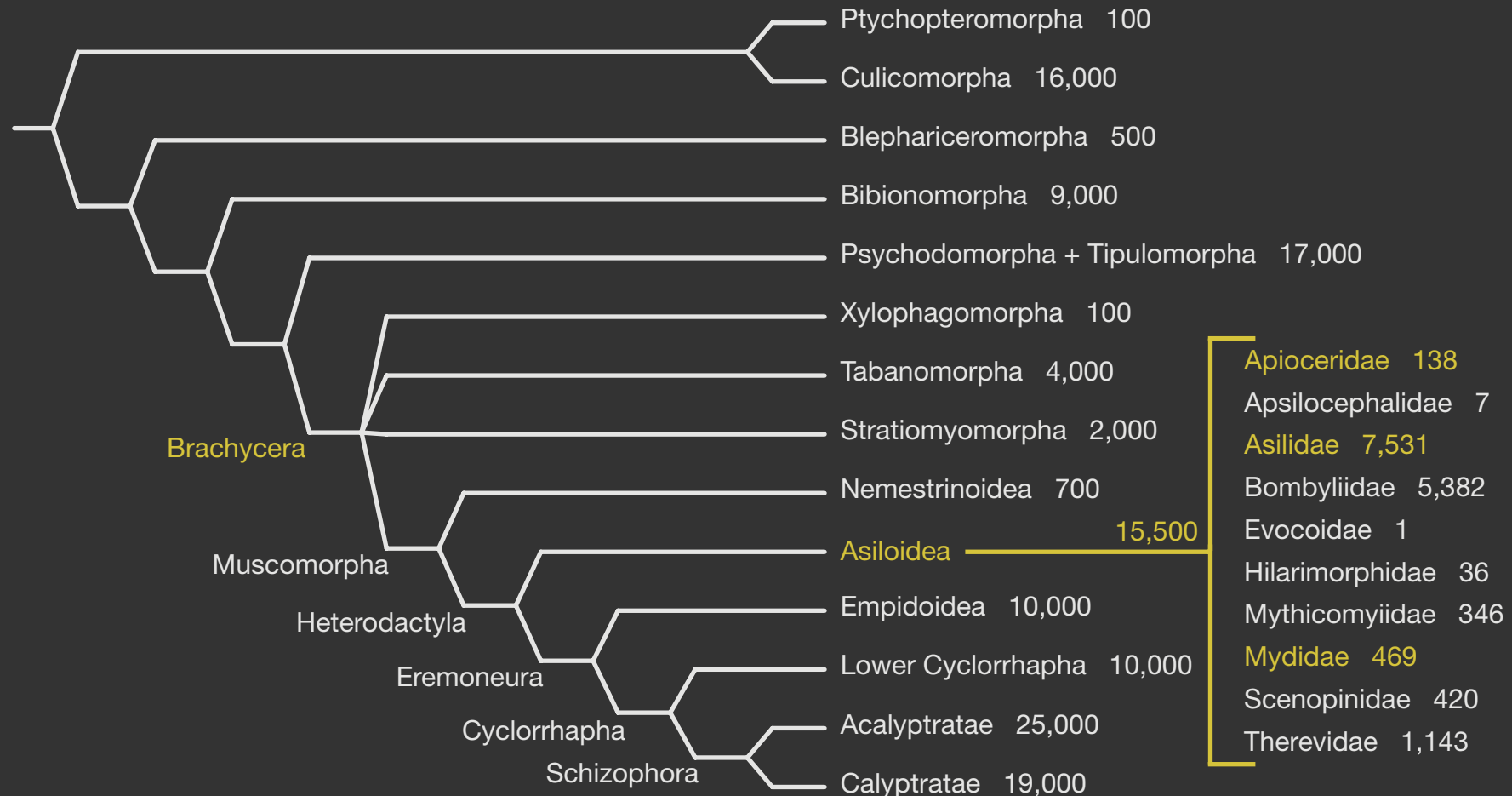
Phylogenetic Systematics

- ◇ evolutionary (phylogenetic) relationships among species
- ◇ morphological characters
- ◇ molecular characters (DNA)
- ◇ Historical Biogeography
- ◇ *e.g.*, large phylogeny with 175 species

“Taxonomy is . . . the study of species and of the phylogenetic relationships among them and, ultimately, the proposal of a predictive classification consistent with phylogeny.”

Wheeler 1995: 31

Diptera (true flies) = 159,294 valid species



Asilidae – “robber flies” or “assassin flies”

- ◇ Adult flies & larvae predatory
- ◇ 7,531 species world-wide
- ◇ Adult flies 5 – 60 mm
- ◇ Speciose in arid & semi-arid environments, but also in tropical environments
- ◇ Oldest definitive fossil † *Araripogon axelrodi*
 - › Crato Formation, Brazil
 - › Cretaceous: Aptian – Albian
 - › ≈ 112 myo



Scleropogon duncani



† *Araripogon axelrodi*

Mydidae – “mydas flies”

- ◇ Adult flies flower-feeders, some do not feed at all
- ◇ Larvae possibly predatory
- ◇ 469 species and 66 genera world-wide
- ◇ Adult flies 9 – 60 mm (wing length up to 52 mm)
- ◇ Oldest definitive fossil † *Cretomydas santanensis*
 - › Crato Formation, Brazil
 - › Cretaceous: Aptian – Albian
 - › ≈ 112 myo



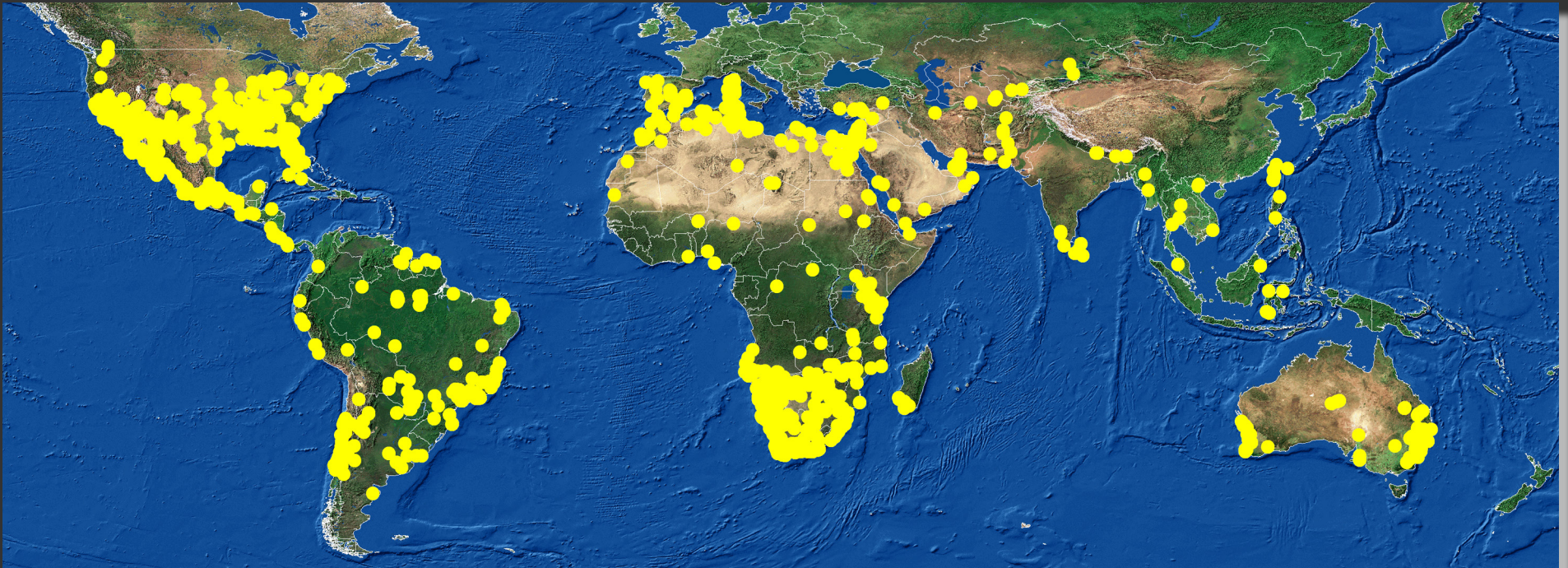
Opomydas townsendi



† *Cretomydas santanensis*

Mydidae – “mydas flies”

- ◇ World-wide primarily in arid regions
- ◇ Half of the world species in southern Africa (primarily South Africa and Namibia)



Apioceridae – “flower-loving flies”

- ◇ Adult flies flower-feeders & larvae possibly predatory
- ◇ 138 species and 1 genus
- ◇ Adult flies 15 – 30 mm
- ◇ Fossil † *Protapiocera* 3 species
 - › † Protapioceridae – closely related to Apioceridae?
 - › Upper Yixian Formation, north-eastern China
 - › Jurassic: Tithonian
 - › $\approx 145 - 150$ myo



Apiocera moerens © Peter Chew



† *Protapiocera convergens* Zhang et al. 2004

Apioceridae – “flower-loving flies”

◇ occur only in

- › Argentina and Chile – 4 species
- › South Africa – 3 species

- › Australia – 67 species
- › western North America – 64 species



Robber flies at Gobabeb

robber flies	<i>Acnephatomyia platygaster</i> (Loew, 1858)	February	—	
	<i>Afromochtherus mendax</i> Tsacas, 1969	February	✓	
	<i>Prytanomyia albida</i> (Oldroyd, 1974)	February	✓	
	<i>Anasillomos juergeni</i> Dikow, 2015	February, October	✓	
	<i>Euscelidia peteraxi</i> Dikow, 2003	June	—	
	<i>Gonioscelis bykanistes</i> Londt, 2004	February	—	
	<i>Hyperechia bifasciata</i> (Grünberg, 1907)	February	✓	
	<i>Torasilus solus</i> Londt, 2005	February, April	✓	
	<i>Trichardis picta</i> Hermann, 1906	November–December, February	✓	
	<i>Stichopogon hermanni</i> Bezzi, 1910	February	✓	
	<i>Stichopogon punctum</i> Loew, 1851	February	✓	Homeb
	<i>Laphyctis</i> sp.	February	✓	

Species names in yellow have not been recorded in the scientific literature from Gobabeb before, but were collected by me.

Mydas flies at Gobabeb

mydas flies	<i>Afroleptomydas</i> sp.	March	—	
	<i>Eremohaplomydas</i> sp. nov.	May	—	
	<i>Namadytes vansonii</i> Hesse, 1969	February–May, July	—	
	<i>Namibimydas psamminos</i> Dikow, 2012	February	—	Homeb
	<i>Parectyphus namibiensis</i> Hesse, 1972	?	—	
	unidentified <i>Syllegomydinae</i>	April	—	
	unidentified <i>Syllegomydinae</i>	November–January	—	

OBSERVATIONS ON THE BEHAVIOUR, PHENOLOGY AND HABITAT PREFERENCES OF MYDAS FLIES IN THE CENTRAL NAMIB DESERT (DIPTERA: MYDIDAE)

ROBERT A. WHARTON

Desert Ecological Research Unit, South West Africa/Namibia

(With one Table)

Wharton 1982

August–December, May–June

Prytanomyia albida (Oldroyd, 1974)



photographed near Cape Cross on coastal dunes

Trichardis picta



photographed in Kuiseb riverbed at Gobabeb

Laphystia sp.



photographed in Kuiseb riverbed at Gobabeb

Anasillomos juergeni Dikow, 2015



photographed on dunes at Gobabeb

Review of *Namibimydas* Hesse, 1972 and *Nothomydas* Hesse, 1969 with the description of new species (Dikow, 2012 doi:[10.5733/afn.053.0105](https://doi.org/10.5733/afn.053.0105))

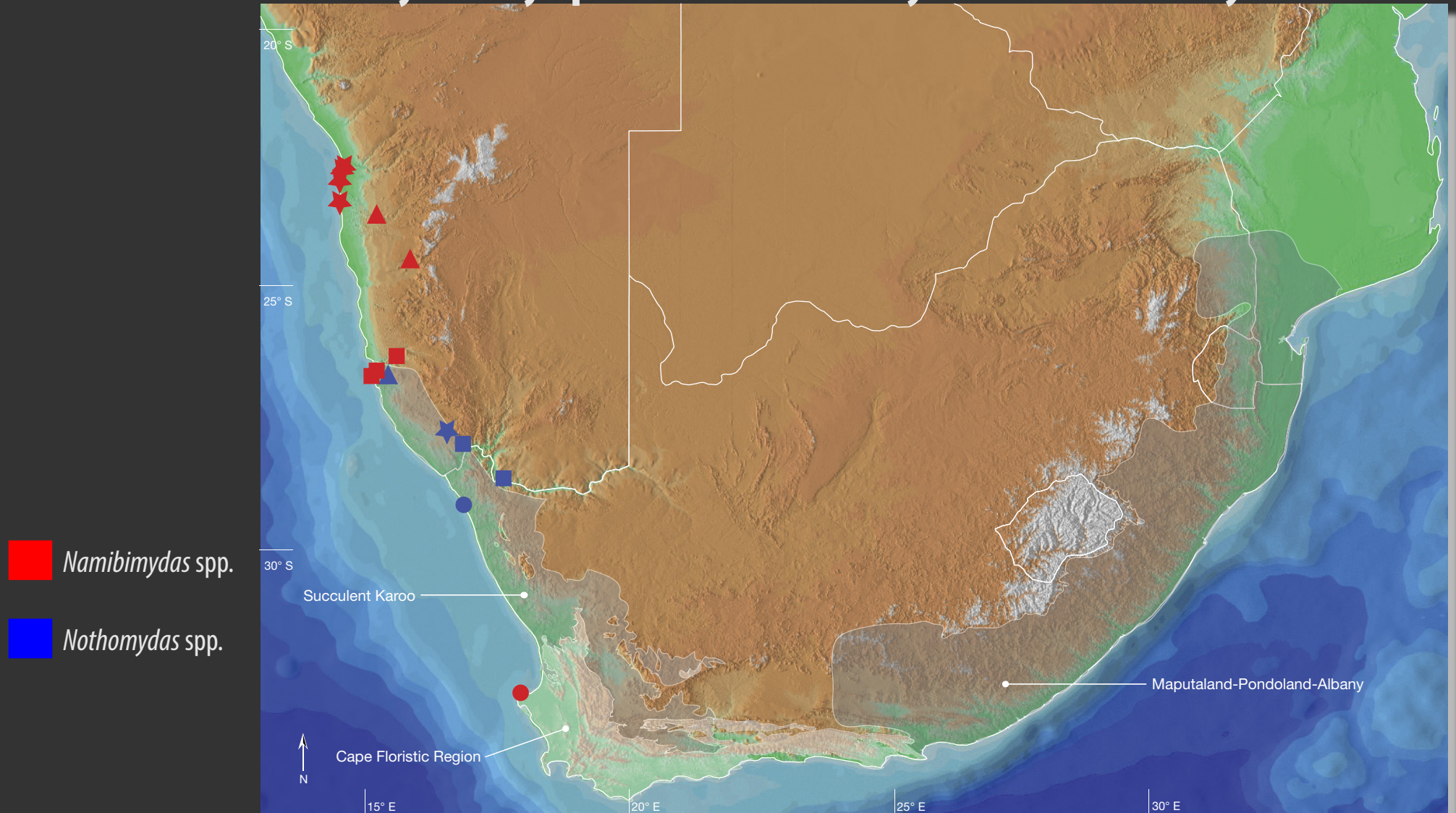


Namibimydas stuckenbergi sp. nov.



Nothomydas gariepinus Hesse, 1969

Distribution of the mydas-fly species of *Namibimydas* and *Nothomydas*



Taxonomic revision of *Ectyphus* Gerstaecker, 1868 and *Parectyphus* Hesse, 1972 with a key to world Ectyphinae (Lyons & Dikow 2010 doi:[10.3897/zookeys.73.840](https://doi.org/10.3897/zookeys.73.840))

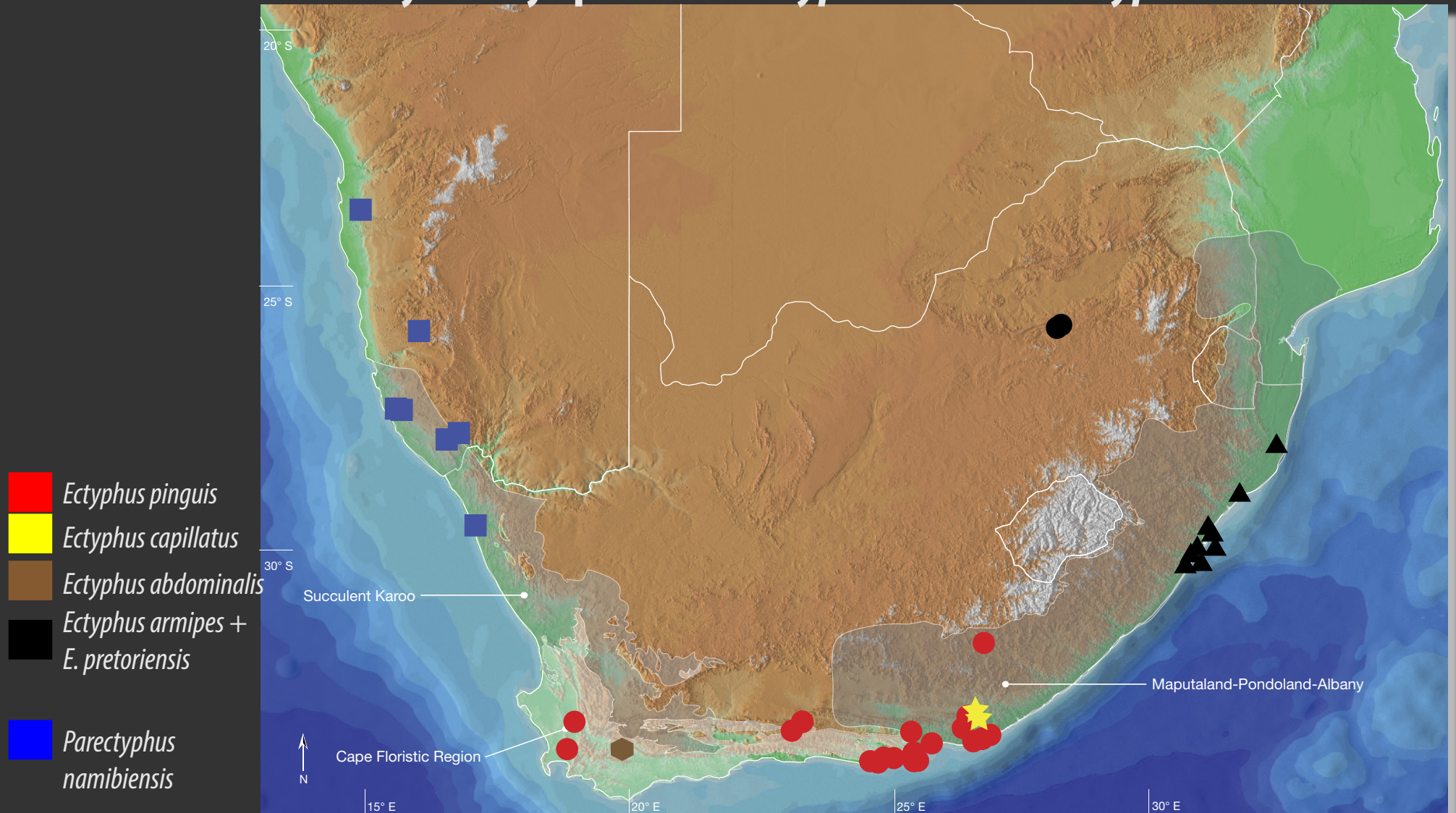


Ectyphus pinguis Gerstaecker, 1868



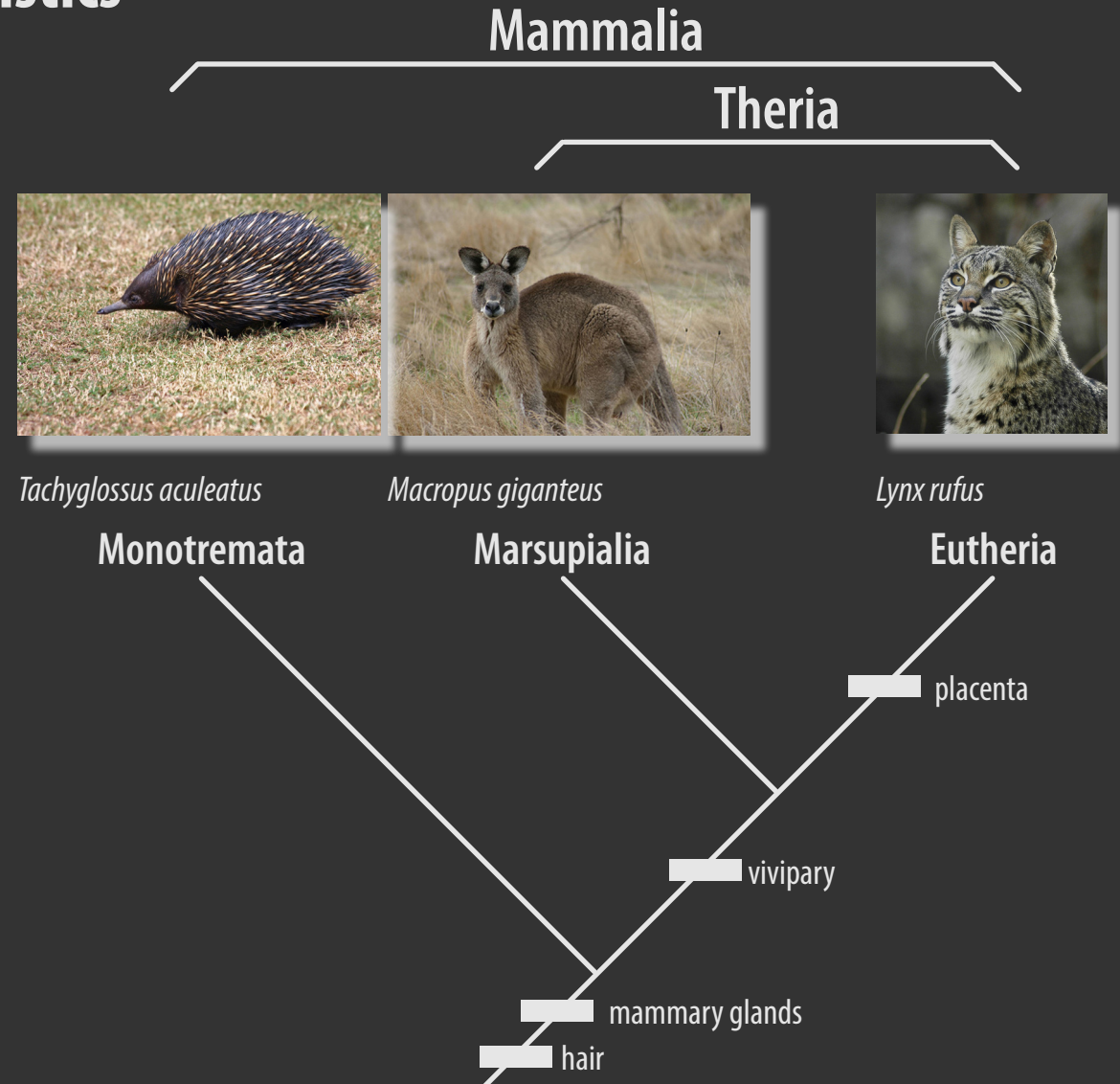
Parectyphus namibiensis Hesse, 1972

Distribution of the mydas-fly species of *Ectyphus* and *Parectyphus*

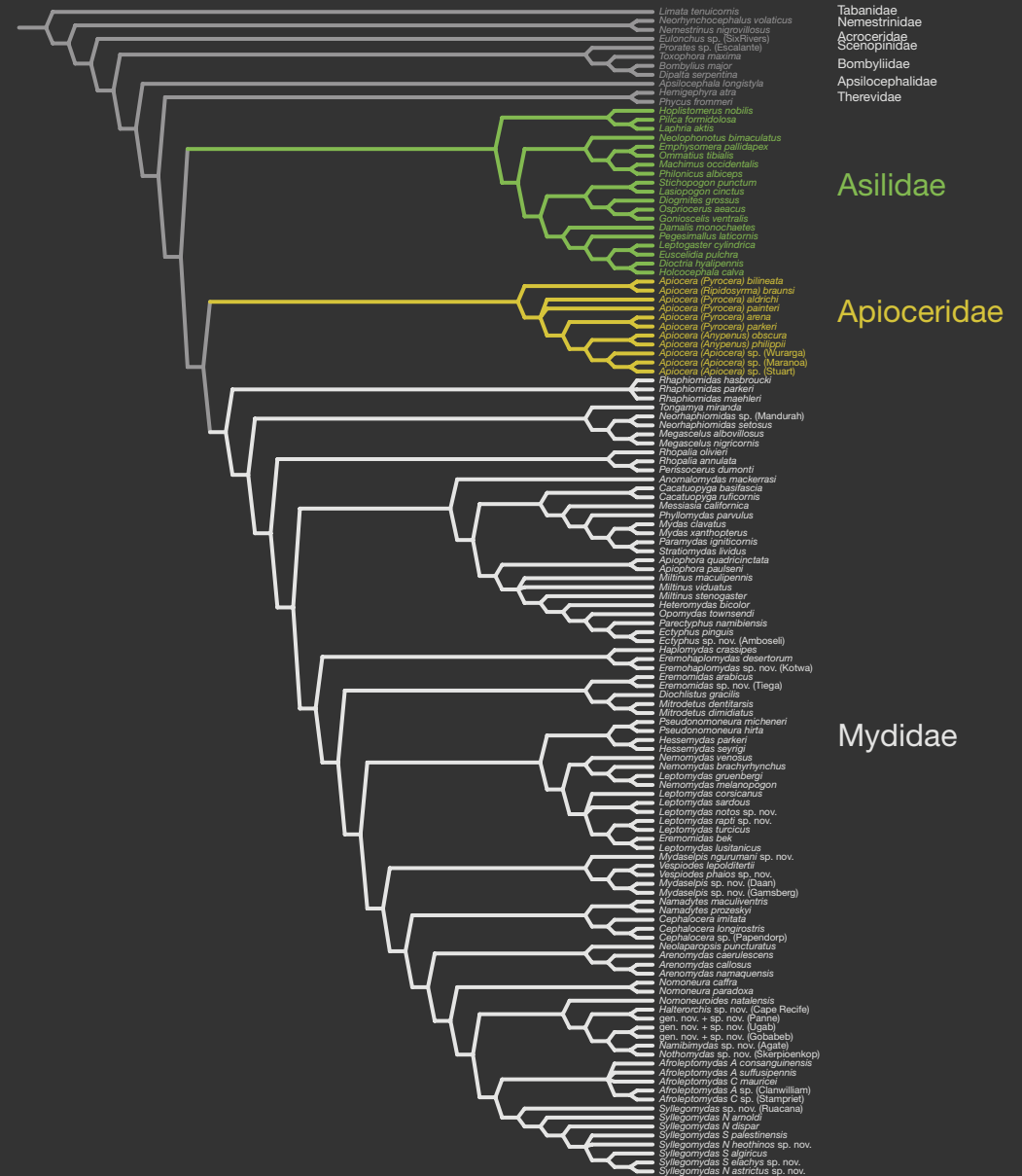


Phylogenetic Systematics – Cladistics

- › evolutionary relationships
- › homology = similarity due to common descent (very basic definition)
- › only synapomorphies provide evidence of common ancestry
- › only monophyla are explicitly based on common ancestry



Evolutionary relationships among Apioceridae, Asilidae, & Mydidae



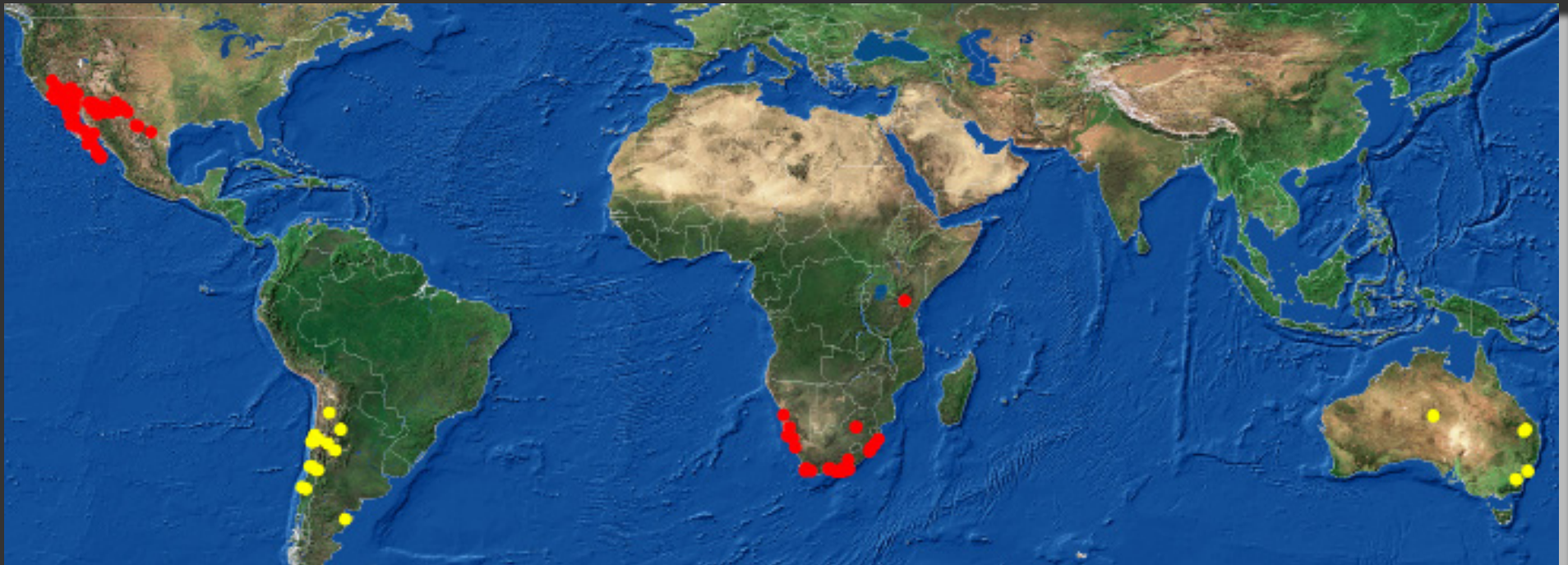
Mitrodetus dentitarsis © Steve Marshall



●
Diochlistinae

●
Ectyphinae

Heteromydas bicolor © Greg Ballmer

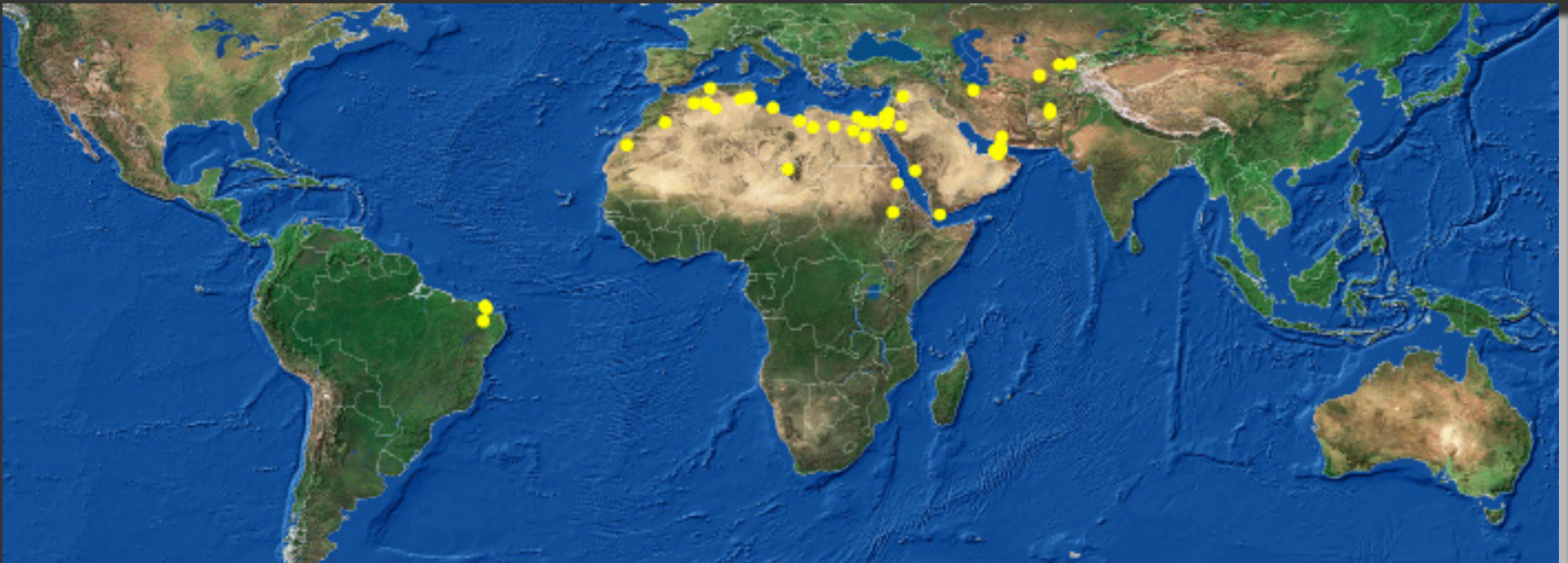


Pseudorhopalia mirandai



Rhopaliinae

Perissocerus arabicus © Drew Gardner





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