

Deserts: biodiversity + climate change



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NATURAL
HISTORY

Smithsonian



interdune valley, Kahani dunes, Namib Desert, Namibia





Hodotermites mossambicus
Hodotermitidae – northern harvester termite

interdune valley, Kahani dunes, Namib Desert, Namibia



Ganab, gravel plain with dry wash + acacias
Namib Desert, Namibia



Tenebrionidae – darkling beetle



Namadytes vansoni Mydidae – mydas fly



Saguaro (*Carnegiea gigantea*)
Sonoran Desert



Welwitschia (*Welwitschia mirabilis*)
Namib Desert



assassin flies – Asilidae

predator

predator

7,500+

temperate, tropical, + deserts

larvae

adult flies

species world

environments

mydas flies – Mydidae

predator

flower feeder

481

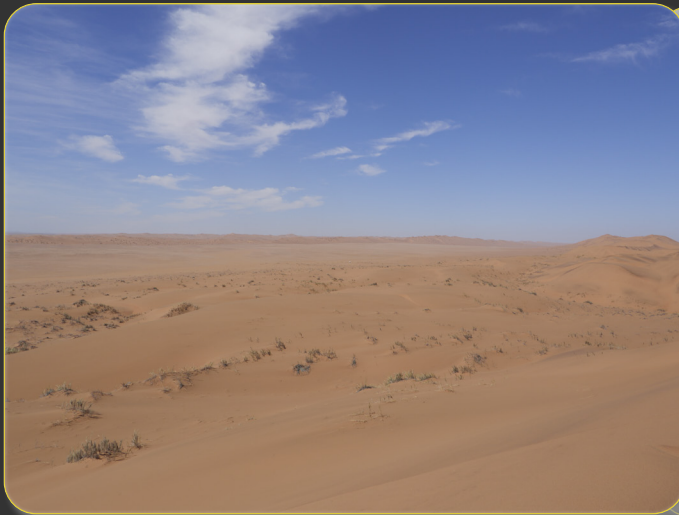
deserts, Mediterranean-type, few tropical



Gonioscelis sp.



Namibimydas psamminos



Myrmeleontidae – ant lion

Orthactia sp. Therevidae – stiletto fly

◇ 19 species recorded to date

◇ February most diverse – 13 spp.

family	subfamily	taxon	species	seasonality												
				Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	
Asilidae	Asilinae		<i>Afromochtherus mendax</i>			x		x				√		x		
Asilidae	Asilinae		<i>Neolophonotus swaensis</i>			x		x				√		x		
Asilidae	Asilinae		<i>Torasilus solus</i>			x		x				x		√		√
Asilidae	Asilinae		<i>Torasilus</i> sp. nov.			x		√				√		x		
Asilidae	Laphriinae		<i>Hoplistomerus nobilis</i>			x		√				x		x		
Asilidae	Laphriinae		<i>Hyperechia bifasciata</i>			x		x				√		x		
Asilidae	Laphriinae		<i>Laphyctis eremia</i>			x		√				√		√		
Asilidae	Laphriinae		<i>Prytanomyia kochi</i>			√		√				√		√		
Asilidae	Laphriinae		<i>Trichardis picta</i>			√		√	√			√		√		
Asilidae	Leptogastrine		<i>Euscelidia peteraxi</i>			x		x				x		x		√
Asilidae	Stenopogoninae		<i>Anasillomos juergeni</i>			√		√	√			√		x		
Asilidae	Stenopogoninae		<i>Corymyia</i> sp. nov.			x		x				√		x		
Asilidae	Stenopogoninae		<i>Gonioscelis bykanistes</i>			x		x				√		x		
Asilidae	Stichopogoninae		<i>Stichopogon hermanni</i>			√		√				√		x		
Asilidae	Stichopogoninae		<i>Stichopogon punctum</i>			x		√				√		x		
Asilidae	Trigonimiminae		<i>Rhipidocephala</i> sp.			x		√				x		x		
Asilidae	Willistoninae		<i>Acnephalmomyia platygaster</i>			x		x				√		x		
Asilidae	Willistoninae		<i>Astiptomyia bikos</i>			x		√				x		x		
Asilidae	Willistoninae		<i>Sporadothrix</i> sp. nov.			√		x				x		x		
						5		10		2		13		4		2



Prytanomyia kochi



Trichardis picta

- ◇ 11 species recorded to date
 - › highest diversity world-wide
- ◇ November most diverse – 5 spp.
- ◇ in every month, at least 1 spp. active
 - › no other place on earth

family	subfamily	taxon	species	seasonality											
				Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Mydidae	Ectyphinae		<i>Parectyphus namibiensis</i>	√	√	√		x			x		x		√
Mydidae	Syllegomydinae		<i>Afroleptomydas</i> sp.			x		√	√		√	√	x		
Mydidae	Syllegomydinae		<i>Eremohaplomydas gobabebensis</i>			x		√			x		x		
Mydidae	Syllegomydinae		<i>Eremohaplomydas whartoni</i>			x		x			x		x	√	
Mydidae	Syllegomydinae		<i>Namadytes vansoni</i>			x		x		√	√	√	√	√	√
Mydidae	Syllegomydinae		<i>Namibimydas psamminos</i>			x		√			√		x		
Mydidae	Syllegomydinae		<i>Syllegomydas</i> sp. nov.			x		√			x		√		
Mydidae	Syllegomydinae		<i>Syllegomydas</i> sp. nov.			x		x			x		x	√	
Mydidae	Syllegomydinae		genus B			√		x			x		x		
Mydidae	Syllegomydinae		genus E			√	√	√	√		x		x		
Mydidae	Syllegomydinae		genus F			x		x	√		x		x		
				1	1	3	1	5	3	1	3	2	2	3	2



Eremohaplomydas gobabebensis



genus E sp. nov.

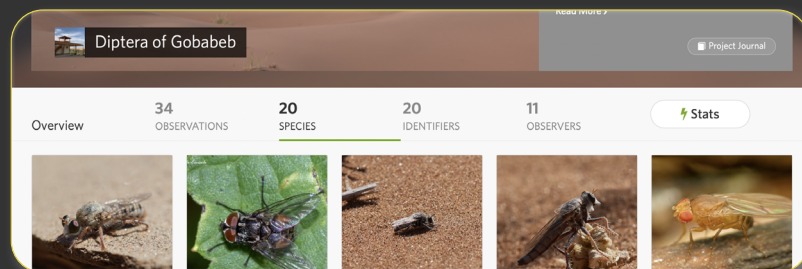
- ◇ temperature rise
 - › can desert species adapt to even higher temperatures?
 - › will desert species just change seasonal activity?
- ◇ less (or more irregular) precipitation
 - › do all desert species rely on rain?
- ◇ natural history collections
 - › historical records
 - › data-capture USNM Chihuahuan, Mojave, + Sonoran asiloid flies
- ◇ collect + observe now
 - › compare to previously collected specimens
 - › build baseline data – today's climate change impact
 - › provide high-quality data for 10, 20, . . . years from now



Onymacris sp. Tenebrionidae – darkling beetle



Orthactia sp. Therevidae – stiletto fly



◇ funding

- › NMNH Core grant (2017) + Small grant (2019)
- › GGI Peer grant (2015)
- › NSF REVSYS Grant (DEB0919333 2009)
- › FMNH Women's Board Field Dreams award

◇ field-work

- › NCRST and MEFT permitting agencies in Namibia
- › Gillian Maggs-Kölling, Leena Kapulwa, + Eugene Marais at Gobabeb Namib Research Institute
- › Allan Cabrero, Charlotte Alberts, + Brandon Claridge

◇ museum collections

- › Kirstin Williams + John Midgley at KwaZulu-Natal Museum
- › Francois Becker at National Museum of Namibia



Jilandria (Acacia) erioloba



!nara flower, *Acanthosicyos horridus*, with aphids + ants