

Digital supplementary material to

CAMPBELL, H., FELLOWES, M.D.E. & COOK, J.M. 2015: Species diversity and dominance-richness relationships for ground and arboreal ant (Hymenoptera: Formicidae) assemblages in Namibian desert, salt pan, and savannah. – Myrmecological News 21: 37-47.

Appendix S1: Images of each habitat type: (a) savannah at Kuzikus, (b) salt pan at Kuzikus, and (c) desert at Gobabeb, as well as examples of bait stations on (d-f) tree trunk, branches and bait used.





Appendix S2: Species found during bait surveys and hand collections at Kuzikus (savannah and saltpan) and Gobabeb (desert) on the ground (G) and on trees (T).

Species	Method	Savannah		Saltpan		Desert	
		G	T	G	T	G	T
Dolichoderinae							
<i>Tapinoma subtile</i>	Bait and survey		×				×
Formicinae							
<i>Anoplolepis steingroeveri</i>	Bait	×				×	
<i>Camponotus detritus</i>	Survey					×	
<i>Camponotus fulvopilosus</i>	Bait			×	×		
<i>Camponotus mystaceus</i> var. <i>kamae</i>	Survey	×					
<i>Camponotus</i> sp. A	Bait			×	×		
<i>Camponotus</i> sp. B	Bait			×	×		
<i>Camponotus</i> sp. C	Bait		×				
<i>Camponotus</i> sp. D	Survey					×	
<i>Lepisiota</i> sp. A	Bait	×					
<i>Lepisiota</i> sp. B	Bait				×		
<i>Lepisiota</i> sp. C	Bait					×	×
<i>Lepisiota</i> sp. D	Bait						×
<i>Lepisiota</i> sp. E	Bait			×			
<i>Lepisiota</i> sp. F	Bait		×				
<i>Tapinolepis</i> sp. A	Survey			×			
Myrmicinae							
<i>Cataulacus intrudens</i>	Survey		×				
<i>Crematogaster</i> sp. A	Bait		×				
<i>Crematogaster</i> sp. B	Bait				×		
<i>Crematogaster</i> sp. C	Bait				×		
<i>Crematogaster</i> sp. D	Survey						×
<i>Messor denticornis</i>	Survey			×			
<i>Monomorium alamarum</i>	Bait			×			
<i>Monomorium damarensis</i>	Bait			×			
<i>Monomorium esharre</i>	Bait	×					
<i>Monomorium mediocre</i>	Bait			×			
<i>Monomorium notulum</i>	Bait			×			
<i>Monomorium rufulum</i>	Bait	×		×			
<i>Monomorium setuliferum</i>	Bait			×			
<i>Ocymyrmex cavatodorsatus</i>	Bait			×			
<i>Ocymyrmex micans</i>	Bait			×			
<i>Ocymyrmex resekhes</i>	Bait	×					
<i>Ocymyrmex robustior</i>	Bait					×	
<i>Pheidole tenuinodis</i>	Bait	×		×			
<i>Pheidole</i> sp. A	Bait			×			
<i>Pheidole</i> sp. B	Bait			×			
<i>Pheidole</i> sp. C	Bait			×			
<i>Pheidole</i> sp. D	Bait		×				
<i>Tetramorium sericeiventre</i>	Bait			×			
<i>Tetramorium setuliferum</i>	Survey	×					
<i>Tetramorium</i> sp. A	Bait			×			
Pseudomyrmecinae							
<i>Tetraponera ambigua</i>	Bait and survey		×				×

Appendix S3: Details of numerical and behavioural dominance measures at Kuzikus and Gobabeb as summarised in Table 2. The measures used for assessment of dominance of ants at Kuzikus and Gobabeb are (a) percentage of baits monopolised, (b) mean abundance score, and (c) behavioural dominance score. The methods used for calculating each dominance measure are listed below.

Appendix S3a: Percentage of baits monopolised. Less than 20 indicates that whilst this was the only species present at a bait there were less than 20 individuals of that species. Monopolised indicates that ant species was the only one present at a bait and there were more than 20 individuals present. Shared indicates that a species was present on the bait with at least one individual of a different ant species.

Habitat Species	< 20	Mono- polised	Shared	Total baits present	Monopolised < 20 individuals (%)	Baits mono- polised (%)
Savannah						
Ground						
<i>Anoplolepis steingroeveri</i>	1	1		2	50	100
<i>Lepisiota</i> sp. A	1	1		2	50	100
<i>Monomorium esharre</i>			1	1	0	0
<i>Monomorium rufulum</i>	14	33	12	59	55.9	79.7
<i>Ocymyrmex resekhes</i>	15	4	11	30	13.3	63.3
<i>Pheidole tenuinodis</i>			2	2	0	0
Tree						
<i>Camponotus</i> sp. C			3	3	0	0
<i>Crematogaster</i> sp. A	4	18	3	25	72	88
<i>Lepisiota</i> sp. F	7		1	8	0	87.5
Saltpan						
Ground						
<i>Camponotus fulvopilosus</i>			1	1	0	0
<i>Camponotus</i> sp. A	2		2	4	0	50
<i>Camponotus</i> sp. B			2	2	0	0
<i>Lepisiota</i> sp. E	1		1	2	0	50
<i>Monomorium alamarum</i>		1		1	100	100
<i>Monomorium damarensense</i>		3		3	100	100
<i>Monomorium notulum</i>		1		1	100	100
<i>Monomorium rufulum</i>			3	3	0	0
<i>Monomorium setuliferum</i>	6	1	1	8	12.5	87.5
<i>Monorium mediocre</i>		1	2	3	33.3	33.3
<i>Ocymyrmex cava todorsatus</i>			1	1	0	0
<i>Ocymyrmex micans</i>	20	7	4	31	22.6	87.1
<i>Pheidole</i> sp. A			2	2	0	0
<i>Pheidole</i> sp. B	1			1	0	100
<i>Pheidole</i> sp. C			2	2	0	0
<i>Pheidole tenuinodis</i>	9	4	5	18	22.2	72.2
<i>Tetramorium sericeiventre</i>		3	4	7	42.9	42.9
<i>Tetramorium</i> sp. A	4	6	5	15	40.0	66.7
Tree						
<i>Camponotus fulvopilosus</i>	3			3	0	100
<i>Camponotus</i> sp. A	9	1	4	14	7.1	71.4
<i>Camponotus</i> sp. B	1		1	2	0	50
<i>Crematogaster</i> sp. B		2	1	3	66.7	66.7
<i>Crematogaster</i> sp. C		2	4	6	33.3	33.3
<i>Lepisiota</i> sp. B	1	1		2	50	100
Desert						
Ground						
<i>Lepisiota</i> sp. C	13			13	0	100
<i>Ocymyrmex robustior</i>	8			8	0	100
Tree						
<i>Lepisiota</i> sp. C	14			14	0	100
<i>Lepisiota</i> sp. D	5	1	1	7	14.3	85.7
<i>Tapinoma subtile</i>	3			3	0	100
<i>Tetraponera ambigua</i>			1	1	0	0

Appendix S3b: Mean abundance scores. Abundances are scored on a six point scale, see methods for details. The total abundance score is the sum of all abundance scores for a species per habitat type and stratum. For ground baits the maximum abundance was 540 (score of 6×15 baits $\times 6$ baiting sessions) and for tree baits the maximum abundance was 360 (score of 6×10 baits $\times 6$ baiting sessions), except for at the saltpan where only five baiting sessions were possible on trees so the maximum abundance possible was 300. The total presence at baits is the number of baits that a species occurred at summed over all baiting sessions. The mean abundance score is the habitat mean abundance score is calculated to give an overall mean abundance score for a species per habitat type and stratum and is calculated using total data across all six baiting sessions. Mean abundance scores range from a minimum of 1, which is a single individual when a species occurred, to a maximum of 6, which is greater than 50 individuals when a species occurred.

Habitat Species	Total abundance score for habitat	Total presence at baits for habitat	Habitat mean abundance score
Savannah			
Ground			
<i>Anoplolepis steingroeveri</i>	9	2	4.5
<i>Lepisiota</i> sp. A	6	2	3
<i>Monomorium esharre</i>	2	1	2
<i>Monomorium rufulum</i>	248	59	4.2
<i>Ocymyrmex resekhes</i>	92	30	3.1
<i>Pheidole tenuinodis</i>	7	2	3.5
Tree			
<i>Camponotus</i> sp. C	4	3	1.3
<i>Crematogaster</i> sp. A	123	25	4.9
<i>Lepisiota</i> sp. F	13	8	1.6
<i>Pheidole</i> sp. D	11	2	5.5
Saltpan			
Ground			
<i>Camponotus fulvopilosus</i>	2	1	2
<i>Camponotus</i> sp. A	13	4	3.3
<i>Camponotus</i> sp. B	3	2	1.5
<i>Lepisiota</i> sp. E	6	2	3
<i>Monomorium alamarum</i>	5	1	5
<i>Monomorium damarense</i>	15	3	5
<i>Monorium mediocre</i>	7	3	2.3
<i>Monomorium notulum</i>	6	1	6
<i>Monomorium rufulum</i>	10	3	3.3
<i>Monomorium setuliferum</i>	27	8	3.375
<i>Ocymyrmex cavatodorsatus</i>	4	1	4.0
<i>Ocymyrmex micans</i>	110	31	3.5
<i>Pheidole</i> sp. A	3	2	1.5
<i>Pheidole</i> sp. B	4	1	4
<i>Pheidole</i> sp. C	2	1	2
<i>Pheidole tenuinodis</i>	69	18	3.8
<i>Tetramorium sericeiventre</i>		8	0
<i>Tetramorium</i> sp. A	56	15	3.7
Tree			
<i>Camponotus fulvopilosus</i>	3	3	1
<i>Camponotus</i> sp. A	43	14	3.1
<i>Camponotus</i> sp. B	2	2	1
<i>Crematogaster</i> sp. B	42	9	4.7
<i>Crematogaster</i> sp. C			
<i>Lepisiota</i> sp. B	6	2	3
Desert			
Ground			
<i>Ocymyrmex robustior</i>	16	8	2
<i>Lepisiota</i> sp. C	30	13	2.3
Tree			
<i>Lepisiota</i> sp. C	29	14	2.1
<i>Lepisiota</i> sp. D	15	7	2.1
<i>Tapinoma subtile</i>	6	3	2
<i>Tetraponera ambigua</i>	1	1	1

Appendix S3c: Dominance scores. Interactions between species were recorded with species being assigned to behaviour as dominant or subordinate. The dominance score is calculated as a percentage of the encounters in which a species was classified as dominant out of all the interactions that species was involved in.

Habitat Species	Total abundance score for habitat	Total presence at baits for habitat	Habitat mean abundance score
Savannah			
Ground			
<i>Anoplolepis steingroeveri</i>	9	2	4.5
<i>Lepisiota</i> sp. A	6	2	3
<i>Monomorium esharre</i>	2	1	2
<i>Monomorium rufulum</i>	248	59	4.2
<i>Ocymyrmex resekhes</i>	92	30	3.1
<i>Pheidole tenuinodis</i>	7	2	3.5
Tree			
<i>Camponotus</i> sp. C	4	3	1.3
<i>Crematogaster</i> sp. A	123	25	4.9
<i>Lepisiota</i> sp. F	13	8	1.6
<i>Pheidole</i> sp. D	11	2	5.5
Saltpan			
Ground			
<i>Camponotus fulvopilosus</i>	2	1	2
<i>Camponotus</i> sp. A	13	4	3.3
<i>Camponotus</i> sp. B	3	2	1.5
<i>Lepisiota</i> sp. E	6	2	3
<i>Monomorium alamarum</i>	5	1	5
<i>Monomorium damarense</i>	15	3	5
<i>Monorium mediocre</i>	7	3	2.3
<i>Monomorium notulum</i>	6	1	6
<i>Monomorium rufulum</i>	10	3	3.3
<i>Monomorium setuliferum</i>	27	8	3.375
<i>Ocymyrmex cavatodorsatus</i>	4	1	4.0
<i>Ocymyrmex micans</i>	110	31	3.5
<i>Pheidole</i> sp. A	3	2	1.5
<i>Pheidole</i> sp. B	4	1	4
<i>Pheidole</i> sp. C	2	1	2
<i>Pheidole tenuinodis</i>	69	18	3.8
<i>Tetramorium sericeiventre</i>		8	0
<i>Tetramorium</i> sp. A	56	15	3.7
Tree			
<i>Camponotus fulvopilosus</i>	3	3	1
<i>Camponotus</i> sp. A	43	14	3.1
<i>Camponotus</i> sp. B	2	2	1
<i>Crematogaster</i> sp. B	42	9	4.7
<i>Crematogaster</i> sp. C			
<i>Lepisiota</i> sp. B	6	2	3
Desert			
Ground			
<i>Ocymyrmex robustior</i>	16	8	2
<i>Lepisiota</i> sp. C	30	13	2.3
Tree			
<i>Lepisiota</i> sp. C	29	14	2.1
<i>Lepisiota</i> sp. D	15	7	2.1
<i>Tapinoma subtile</i>	6	3	2
<i>Tetraponera ambigua</i>	1	1	1

Appendix S4: Image guide to ants found at Kuzikus and Gobabeb. A repository of high resolution images of additional specimens and close-up images of diagnostic morphological characters, as well as further details on identification of species, can be found online at <http://scienceheather.wordpress.com/>

DOLICHODERINAE

Tapinoma subtile

Kuzikus: Found within swollen-thorns on *V. erioloba* trees during 2009 and 2011. Gobabeb: Found at bait trap on tree 6 (riverbed) at Gobabeb on 28 October 2011.



FORMICINAE

Anoplolepis steingroeveri

Kuzikus: Collected at baits on ground (savannah) on 23 September 2011. Gobabeb: Collected from ground during hand collecting (riverbed) on 3 November 2011.



Camponotus detritus

Gobabeb: Collected from ground during hand collecting (riverbed) on 1 November 2011.



Camponotus fulvopilosus

Kuzikus: Collected at baits on ground (salt pan) on 26 September 2011.



Camponotus mystaceus var. *kamae*

Kuzikus: Collected at night inside tent whilst hunting moths (savannah) on 22 September 2011.



Camponotus sp. A

Kuzikus: Collected at bait traps on trees (savannah) on 22 September 2011 and (salt pan) on 26 and 28 September 2011.



Camponotus sp. B (likely to belong to *rufoglaucus*-group)

Kuzikus: Collected at baits on ground and on trees (salt pan) on 28 September 2011.



Camponotus sp. D

Gobabeb: Collected from tree 282 during hand collecting (riverbed) on 1 November 2011.



Lepisiota sp. A

Kuzikus: Collected at bait traps on ground (savannah) on 20 September 2011 and on trees (savannah) on 22 September 2011.



Lepisiota sp. B

Kuzikus: Collected at bait traps on trees (salt pan) on 13 October 2011.



Lepisiota sp. C

Gobabeb: Collected at bait traps on ground and on trees (riverbed) on 28 - 30 October 2011.



Lepisiota sp. D

Gobabeb: Collected at bait traps on trees (riverbed) on 29 October 2011.



Lepisiota sp. E

Kuzikus: Collected at bait traps on ground (saltpan) on 26 September 2011.



Tapinolepis sp. A

Kuzikus: Collected from ground during hand collecting (saltpan) on 13 October 2011.

MYRMICINAE

Cataulacus intrudens

Kuzikus: Collected from inside swollen-thorns on *V. erioloba* (savannah) in 2009 and 2011.



Crematogaster sp. A

Kuzikus: Collected from inside swollen-thorns and on branches on *V. erioloba* (savannah) in 2009 and 2011.



Crematogaster sp. B

Kuzikus: Collected at bait traps on ground (saltpan) on 28 September 2011.



Crematogaster sp. C

Kuzikus: Collected at bait traps on ground (saltpan) on 28 September 2011.



Messor denticornis

Kuzikus: Collected from ground during hand collecting (saltpan) on 26 September 2011.



Monomorium alamarum

Kuzikus: Collected at bait traps on ground (saltpan) on 26 September 2011.



Monomorium damarensense

Kuzikus: Collected at bait traps on ground (saltpan) on 26 September 2011.



Monomorium esharre

Kuzikus: Collected at bait traps on ground (savannah) on 22 September 2011.



Monomorium mediocre

Kuzikus: Collected at bait traps on ground (savannah) on 22 September 2011 and on ground (saltpan) on 26 September 2011.



Monomorium notulum

Kuzikus: Collected at bait traps on ground (saltpan) on 26 September 2011.



Monomorium rufulum

Kuzikus: Collected at bait traps on ground (savannah) on 20 September 2011 and on ground (saltpan) on 26 September 2011.



Monomorium setuliferum

Kuzikus: Collected at bait traps on ground (saltpan) on 26 and 28 September 2011.



Ocymyrmex cavatodorsatus

Kuzikus: Collected at bait traps on ground (saltpan) on 13 October 2011.



Ocymyrmex micans

Kuzikus: Collected at bait traps on ground (saltpan) on 28 September 2011.



Ocymyrmex resekhes

Kuzikus: Collected at bait traps on ground (savannah) on 20 and 24 September 2011.



Ocymyrmex robustior

Gobabeb: Collected at bait traps on ground (riverbed) on 28 and 30 October 2011.



Pheidole tenuinodis

Kuzikus: Collected at bait traps on ground (savannah) on 22 September 2011 and on ground (saltpan) on 26 September 2011.



Pheidole sp. A

Kuzikus: Collected at bait traps on ground (saltpan) on 26 September 2011.



Pheidole sp. B

Kuzikus: Collected at bait traps on ground (saltpan) on 26 September 2011.



Pheidole sp. C

Kuzikus: Collected at bait traps on ground (saltpan) on 28 September 2011.



Pheidole sp. D

Kuzikus: Collected at bait traps on trees (savannah) on 20 September 2011.



Tetramorium sericeiventre

Kuzikus: Collected at bait traps on ground (saltpan) on 26 and 28 September 2011.



Tetramorium setuliferum

Kuzikus: Collected at bait traps on ground (savannah) on 20 September 2011 and on ground (saltpan) on 26 September 2011.



PSEUDOMYRMECINAE

Tetraponera ambigua

Kuzikus: Collected from inside swollen-thorns and on branches on *V. erioloba* (savannah) on various dates in 2009 and 2011.

Gobabeb: Collected at bait traps on tree (riverbed) on 29 October 2011.

