

**Table S1** Means ( $\pm$ SD) of a) soil properties, b) herbaceous vegetation properties and c) shrub (<3m height) and tree numbers at maize fields and natural habitats in Botswana and Namibia in the wet season. Only shrub and tree species with a minimum average number of 1 individual per plot are listed.

a) Soil properties	Botswana		Namibia	
	Maize	Natural	Maize	Natural
pH values	6.44 $\pm$ 0.48	6.42 $\pm$ 0.35	6.95 $\pm$ 0.46	6.51 $\pm$ 0.30
Electrical conductivity ( $\mu$ S/cm)	234.75 $\pm$ 37.23	259.75 $\pm$ 22.23	341.38 $\pm$ 75.64	262 $\pm$ 20.65
Total soil organic carbon (%)	0.59 $\pm$ 0.20	0.71 $\pm$ 0.13	0.56 $\pm$ 0.09	0.56 $\pm$ 0.13
Total soil nitrogen (%)	0.07 $\pm$ 0.02	0.11 $\pm$ 0.02	0.09 $\pm$ 0.01	0.13 $\pm$ 0.13
Total Phosphohate (ppm)	5.83 $\pm$ 3.69	11.01 $\pm$ 5.35	13.79 $\pm$ 21.61	1.31 $\pm$ 1.2
Total Potassium (ppm)	99.75 $\pm$ 91.95	113.75 $\pm$ 93.16	42.76 $\pm$ 40.47	22.7 $\pm$ 20.83
Sand content (%)	80.76 $\pm$ 2.72	80.94 $\pm$ 6.09	88.21 $\pm$ 3.23	88.98 $\pm$ 3.69
Silt content (%)	8.33 $\pm$ 1.86	8.58 $\pm$ 3.17	9.19 $\pm$ 2.50	8.74 $\pm$ 3.66
Clay content (%)	10.91 $\pm$ 2.07	10.5 $\pm$ 3.84	2.56 $\pm$ 1.18	2.28 $\pm$ 0.71
b) Herbaceous vegetation	Maize	Natural	Maize	Natural
Grass cover (%)		14.6 $\pm$ 10.1		9.6 $\pm$ 9.8
Herb cover (%)		0.8 $\pm$ 1.3		0 $\pm$ 0
Flower cover (%)		69.1 $\pm$ 20.7		89.3 $\pm$ 10.2
Bare ground (%)		16.3 $\pm$ 13.6		1 $\pm$ 0.8
Max height (cm)		0.9 $\pm$ 1		0.5 $\pm$ 0.3
c) Shrubs & trees	Maize	Natural	Maize	Natural
<i>Colophospermum mopane</i>		17 $\pm$ 25		2 $\pm$ 5
<i>Grewia bicolor</i>		5 $\pm$ 5		1 $\pm$ 4
<i>Combretum apiculatum</i>		2 $\pm$ 2		0 $\pm$ 0
<i>Vachellia tortilis</i>		2 $\pm$ 3		0 $\pm$ 0
<i>Senegalia erubenses</i>		2 $\pm$ 6		0 $\pm$ 0
<i>Senegalia nigrescens</i>		2 $\pm$ 3		1 $\pm$ 0
<i>Dichrostachys cinerea</i>		2 $\pm$ 1		5 $\pm$ 5
<i>Boscia albitrunca</i>		1 $\pm$ 4		0 $\pm$ 0
<i>Commiphora glandulosa</i>		1 $\pm$ 1		0 $\pm$ 0
<i>Vachellia erioloba</i>		0 $\pm$ 1		2 $\pm$ 2
<i>Grewia flavescens</i>		0 $\pm$ 1		3 $\pm$ 2
<i>Terminalia sericea</i>		0 $\pm$ 0		34 $\pm$ 40
<i>Baphia massaiensis</i>		0 $\pm$ 0		11 $\pm$ 15
<i>Combretum mossambicense</i>		0 $\pm$ 0		8 $\pm$ 15
<i>Bauhinia petersiana</i>		0 $\pm$ 0		3 $\pm$ 7
<i>Combretum collinum</i>		0 $\pm$ 0		3 $\pm$ 3
<i>Ximenia americana</i>		0 $\pm$ 0		2 $\pm$ 4
<i>Ximenia caffra caffra</i>		0 $\pm$ 0		2 $\pm$ 3
<i>Searsia tenuinervis</i>		0 $\pm$ 0		2 $\pm$ 5
<i>Commiphora pyracanthoides</i>		0 $\pm$ 0		1 $\pm$ 2
<i>Peltophorum africanum</i>		0 $\pm$ 0		1 $\pm$ 2
<i>Ziziphus mucronata</i>		0 $\pm$ 0		1 $\pm$ 2
<i>Berchemia discolor</i>		0 $\pm$ 0		1 $\pm$ 2

**Table S2** Methods used for soil analyses

<b>Task</b>	<b>Method</b>
SAMPLE PREPARATION	Soil samples are dried at a temperature not greater than 35 degrees C. The part of the sample retained on a 2 mm sieve, called the fine earth fraction, is used for analysis. The fraction >2mm is referred to as stones and gravel.
AVAILABLE PHOSPHORUS	Ohlsen method: Extraction with sodium bicarbonate. Phosphate measured spectrophotometrically using the phosphomolybdate blue method.
EXTRACTABLE CATIONS (AVAILABLE K)	Extraction with 1M ammonium acetate at pH 7. Measurement of potassium by atomic absorption spectroscopy.
TEXTURE and PARTICLE SIZE ANALYSIS	Dispersion of soil with sodium hexametaphosphate/sodium carbonate. Determination of silt and clay by pipette method. Sand fraction determined by sieving to retain >53 micron fraction.
ORGANIC CARBON	Walkley-Black method (sulphuric acid-potassium dichromate oxidation). A factor is included in calculations to take account of incomplete oxidation. Organic matter content calculated as organic-C x 1.74.
pH (KCl)	Measured in a 1:2.5 soil : 1M potassium chloride ratio suspension on a mass to volume basis.
ELECTRICAL CONDUCTIVITY	Measurement in the supernatant of the 1:2.5 soil:water suspension prior to measurement of pH. Units of measurement are mS/cm (1 mS=1000 uS). High results indicating possible salinity hazard are repeated on the extract of a saturated soil paste.
TOTAL NITROGEN	The sample is then introduced to the furnace containing only pure oxygen, resulting in a rapid and complete combustion(oxidation). Nitrogen present are oxidized to NOx respectively. The NOx gases are passed through a reduction tube filled with copper to reduce

**Table S3** Grouping of taxonomic groups into major trophic groups and references.

Trophic Group	Taxonomic groups	References
Detritivores	Archaeognatha, Blattodea, Coleoptera (Colydiidae, Nitidulidae, Ptilidae, Scarabaeoidea, Tenebrionidae, Trogidae), Dermaptera, Grylloidea, Isoptera, Thysanura (all insects), Isopoda (Crustacea), Diplopoda (Myriapoda)	
Herbivores	Aphidoidea, Auchenorrhyncha, Caelifera, Coleoptera (Chrysomelidae, Curculionidae, Elateridae, Meloidae), Heteroptera, Psocoptera, Sternorrhyncha (all insects)	Theron 2010, Fischer et al. 2022, Potapov et al. 2022,
Predators	Amblypygi, Araneae, Opiliones, Pseudoscorpiones, Scorpiones, Solifugae (all arachnids), Coleoptera (Cantharidae, Carabidae, Coccinelidae, Histeridae, Staphylinidae), Mantodea (all insects), Chilopoda (Myriapoda)	
Mixed feeders	Formicidae	

Theron, L. (2010). Temporal and spatial composition of arboreal insects along the Omaruru River, Namibia (Doctoral dissertation, University of the Free State).

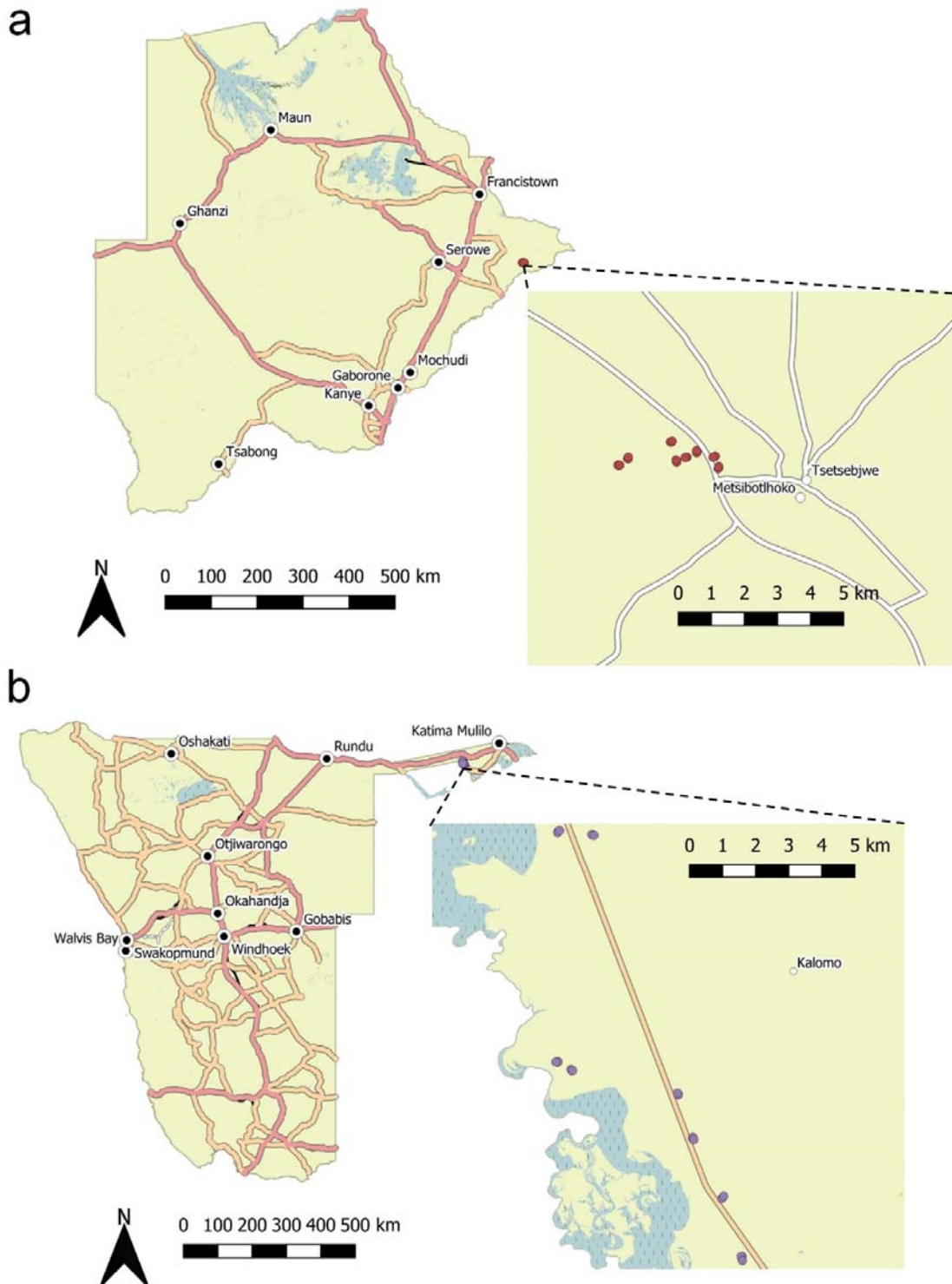
Fischer, C., Gerstmeier, R., & Wagner, T. C. (2022). Seasonal and temporal patterns of rainfall shape arthropod community composition and multi-trophic interactions in an arid environment. *Scientific Reports*, 12(1), 3742.

Potapov, A. M., Beaulieu, F., Birkhofer, K., Bluhm, S. L., Degtyarev, M. I., Devetter, M., ... & Scheu, S. (2022). Feeding habits and multifunctional classification of soil-associated consumers from protists to vertebrates. *Biological Reviews*, 97(3), 1057-1117.

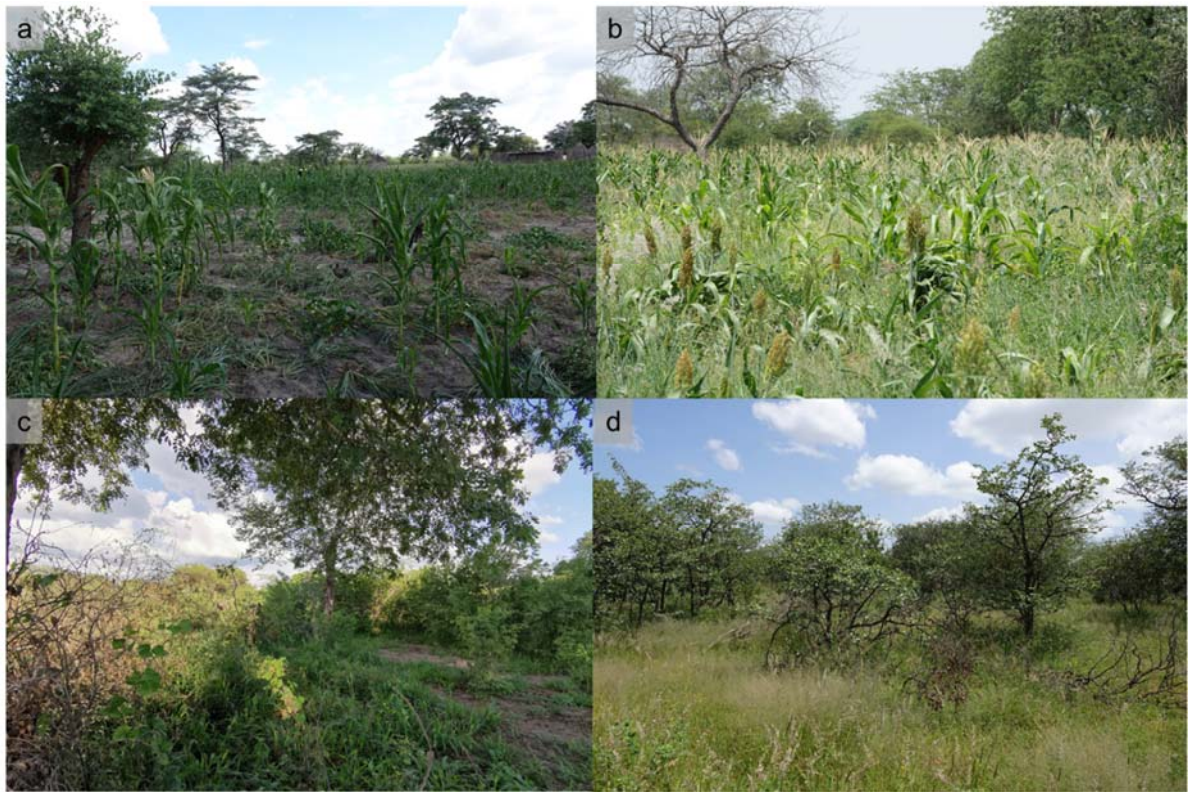
**Table S4** Summary statistics (mean  $\pm$  standard deviation) for the number of individuals per trophic group and site in the two study countries, two sampling seasons and three study habitats.

Level	Detritivores	Herbivores	Predators	Mixed feeders
Botswana	6.3 $\pm$ 3.9	1.3 $\pm$ 1.1	4.9 $\pm$ 2.3	20.1 $\pm$ 14.4
Namibia	5.6 $\pm$ 4.9	1.3 $\pm$ 1.3	4.6 $\pm$ 2.4	29.9 $\pm$ 34.3
Wet	5.3 $\pm$ 3.4	1.1 $\pm$ 0.8	4.0 $\pm$ 2.2	28.9 $\pm$ 28.3
Dry	6.5 $\pm$ 5.2	1.5 $\pm$ 1.4	5.5 $\pm$ 2.2	24.1 $\pm$ 24.9
Maize	5.1 $\pm$ 4.7	1.3 $\pm$ 1.3	4.3 $\pm$ 2.5	25.6 $\pm$ 28.4
Edge	6.8 $\pm$ 4.5	1.5 $\pm$ 1.3	5.6 $\pm$ 2.5	27.1 $\pm$ 32.3
Natural	5.9 $\pm$ 4.0	1.1 $\pm$ 1.0	4.4 $\pm$ 1.8	22.1 $\pm$ 16.8

Figure S1 Study locations in a) Botswana and b) Namibia. © OpenStreetMap



**Figure S2** Maize fields in a) Namibia and b) Botswana and natural habitats in c) Namibia and d) Botswana during the wet season.



**Figure S3** Arrangement of pitfall traps, maize seed cards, artificial caterpillars and dung removal traps in maize, edge and natural habitats. All traps in maize and natural habitats had a minimum distance of 30 m to any other habitat at all sites.

