Unexpectedly high taxonomic diversity of ostracods in the arid Northern Cape Province of South Africa

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AIMS

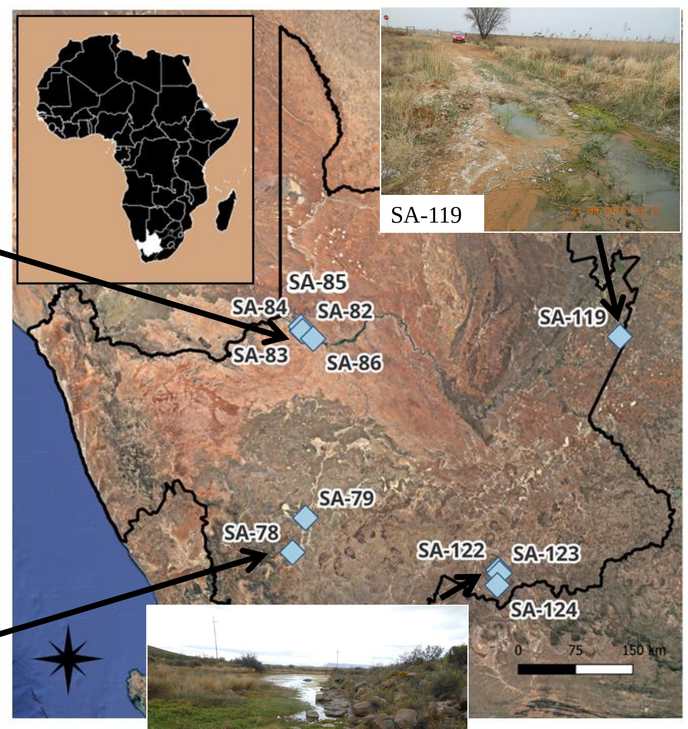
To determine the taxonomic composition and structure of ostracods assemblages inhabiting temporary waters in the Northern Cape Province of South Africa.

STUDY AREA

6-22.09.2012
early spring

11 study sites of temporary waters


SA-86



climate
S: cold desert (BWk)
N: hot desert (BWh)
NE: hot semi-arid (BSh)


SA-78


SA-123

precipitation
E: 500 mm/year (mainly in summer)
W: 100 mm/year (mainly in winter)

METHODS

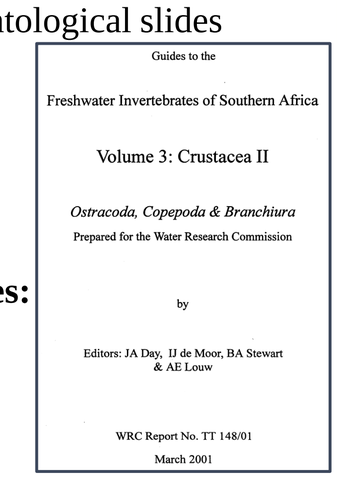
Sample collection:
qualitative sample
depth < 0.5 m
surface > 1 m^2

hand-net
Φ 120 μm

Preservation:
96% ethanol (C_2H_5OH)

After dissection:
soft part → glycerin glass slides
valves → micropalaeontological slides

Identification:
Guides to the freshwater invertebrates of Southern Africa (Vol. 3: Crustacea II) by K. Martens, 2001


Guides to the
Freshwater Invertebrates of Southern Africa
Volume 3: Crustacea II
Ostracoda, Copepoda & Branchiura
Prepared for the Water Research Commission
by
Editors: JA Day, IJ de Moor, BA Stewart & AE Louw
WRC Report No. TT 148/01
March 2001

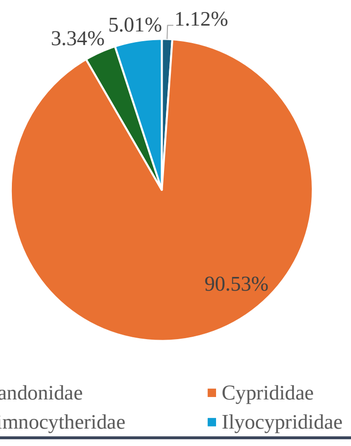
Ecological and statistical analyses:
alfa diversity
beta diversity (Whittaker)
gamma diversity
species frequency
Non-metric Multidimensional Scaling (nMDS)
Permutational Analysis of Variance (PERMANOVA)
expected species richness (Chao 2, Jackknife 2, Bootstrap, Michaelis-Menten)

PRIMER-e
Empowering Research

RESULTS

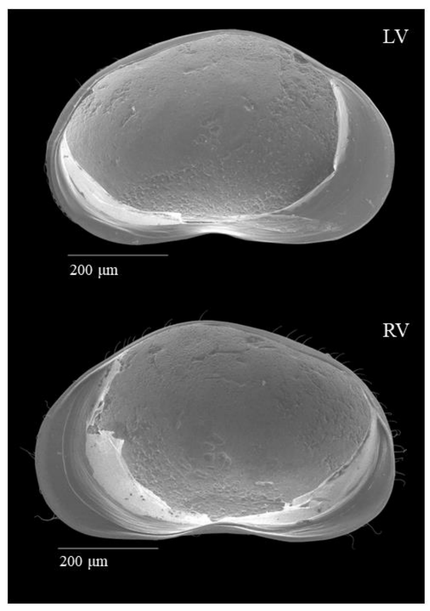
Σ 12 593 specimens, 31 species of 13 genera

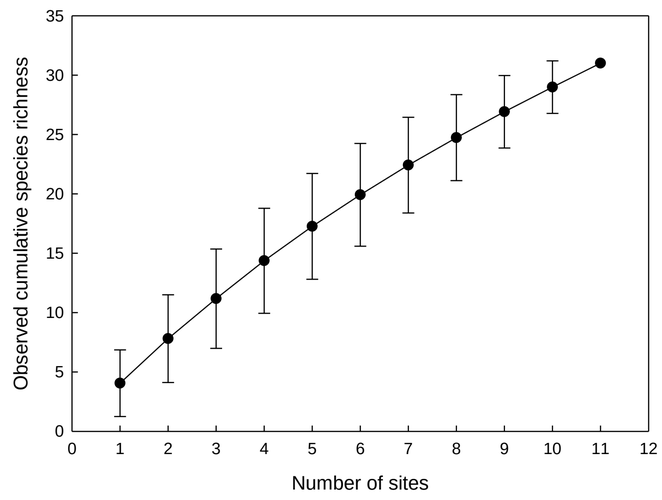
Diversity index	Value
Gamma diversity	31
Global Beta diversity	6.6
Alpha diversity	
Range	1–11
Mean	4.1
SD	3.0
BCa 95% Lower limit	2.4
BCa 95% Upper limit	5.7
Species frequency	
Range	1-4
Mean	1.5
SD	0.8
BCa 95% Lower limit	1.2
BCa 95% Upper limit	1.7



Sarscypridopsis sp. nov. (from SA-85)

The most frequently occurring species (present at 36.4% sites)

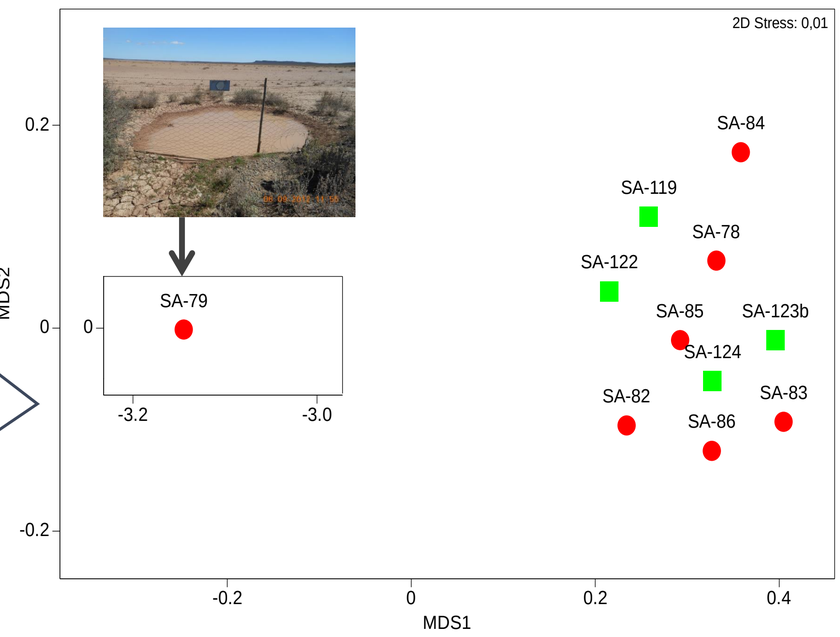




The species accumulation curve of the observed numer of species did not reach an asymptote. Based on expected species richness, we collected between 34-79% of the total expected numer of species present in the sampled area.

nMDS

Ordination plot showing no differences in assemblage structure and composition between samples taken in western (W) and eastern (E) region of the Northern Cape (PERMANOVA Pseudo F = 1.195, P(perm) = 0.240).



Estimator	Chao 2 ± SD	Jackknife 2	Bootstrap	Michaelis-Menten
Expected species richness	79.4 ± 30.7	65.3	39.4	91.1

SUMMARY AND CONCLUSIONS

- Species richness at individual site was moderate and comparable to alfa diversity reported in other Provinces of South Africa such as the Eastern Cape (Namiotko et al., 2023) and North-West (Szwarc et al., 2023) or in Botswana (Szwarc & Namiotko, 2022).
- Together with historical records ostracod fauna of the Northern Cape now includes 40 species – one-third of the total number of non-marine ostracod species known from South Africa.
- The species accumulation curve, which did not asymptote, indicated that several more species remain to be sampled. Further taxonomical surveys can reveal ostracod diversity of the Province, while ecological studies would clarify correlation between ostracod assemblages and environmental conditions.