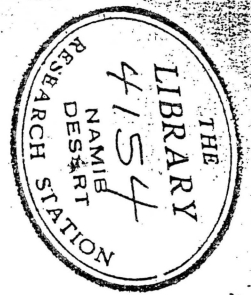


4154 Also: Seely + Wharton, 1980

JOURNAL XXXIV/XXXV - SWA Wissenschaftliche Gesellschaft
Windhoek, SWA, 1979/80 - 1980/81



Journal of the South West Africa
Scientific Society
1980

MARY K. SEELY, W.H. BUSKIRK, W.J. HAMILTON, III
& J.E.W. DIXON

35:57-86

Lower Kuiseb River Perennial Vegetation Survey

(5 Tables, 15 Figures)

D.R.F.N.	Reprints
REFERENCE:	1566
LIBRARY	WJK

Contents

ABSTRACT

INTRODUCTION

Kuiseb River floods

METHODS

Vegetation transects

Fruit production

Animal distribution

Nomenclature

RESULTS AND DISCUSSION

Vegetation analysis

Fruit production

Other plant species

Faunal interactions

Damage to woody vegetation

CONCLUSIONS

ACKNOWLEDGEMENTS

LITERATURE

TABLES

Abstract

The Kuiseb River, located in central South West Africa, is one of several seasonal rivers flowing through the Namib Desert towards the southern Atlantic Ocean. As a linear oasis, it supports an extensive growth of trees and other vegetation which, in turn, allows many non-desertic or partially adapted animal species to extend their range into the true desert. Today, extensive plans to develop this water source for human use threaten the Kuiseb River ecosystem, particularly in its desert reaches.

At least ten species of perennial plants occur in the Kuiseb River system in the Namib Desert: *Acacia robusta*, *Acacia erioloba*, *Tamarix usneoides*, *Euclea pseudebenus*, *Salvadora persica*, *Phoenix dactylifera*, *Ficus sycomor*, *Ficus cordata*, *Maerua schinzii* and *Acanthosicyos horrida*. Their number and canopy

omb. Rain
Difference
Homeb. #

an acyde

e centre
Atlantic
he north
re being
d the use
River is
es and a
ctivities
ts of the
, and
. To
ive been
luminat
critical
Namib

ng from
1° 30'E
l the
(Steng
Name
chmer
throu
Kuis

nts and
solucey
Kuis
xtreme
depen
ve been
l, more
(1964),
(1975)
. Gies
(1969).

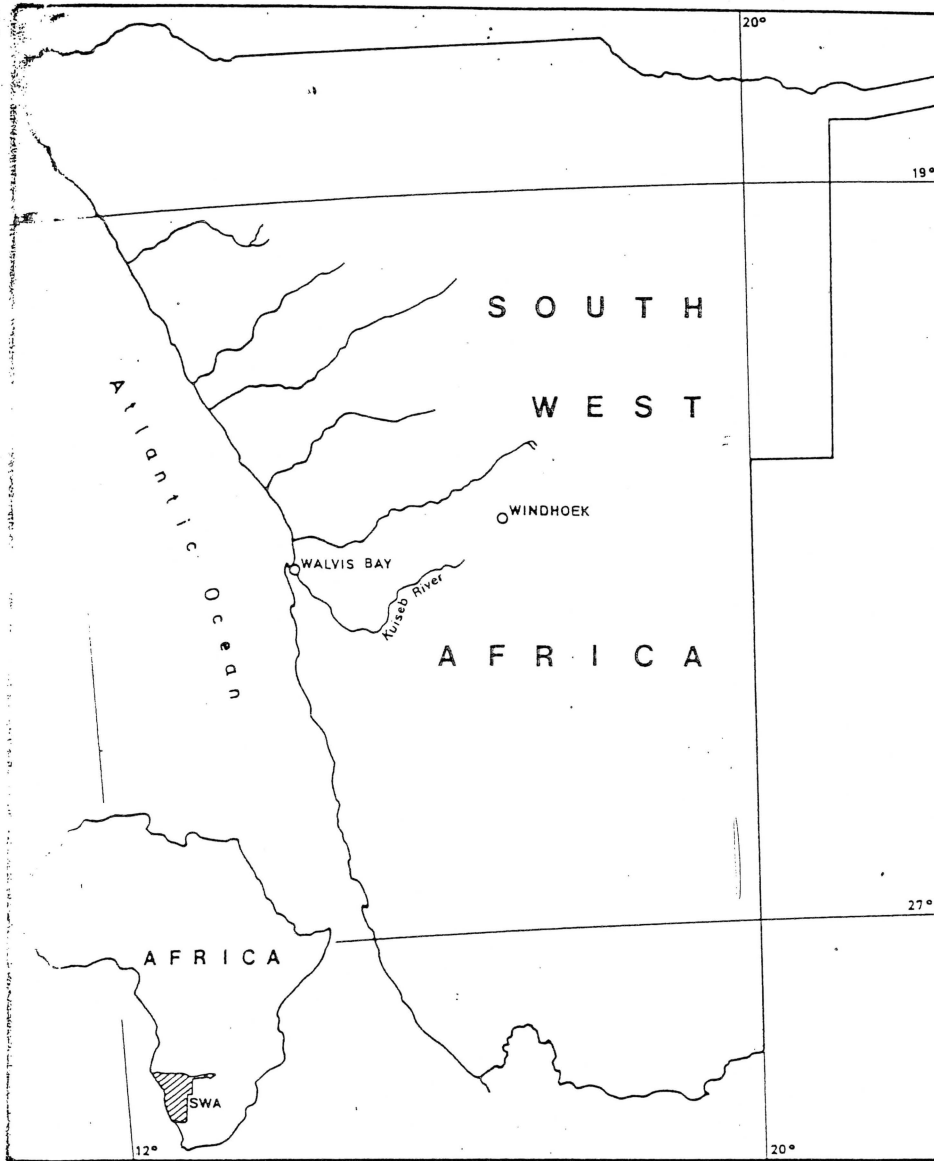


Figure 1. The Kuiseb River of central South West Africa drains the highlands and flows westward through the Namib Desert towards the southern Atlantic Ocean.

977,
Shler
Other
amib

flood
inate
from
n the
d fif-
years
nably
delta
ere of
3 the
eb at
6 the
rvals
1963
Rooi-
Water
n the
er ex-
bove
con-
finite
)

-4 m
oving
oves
icate
t and
flow,
r and

ation
th of
ge at
ining
s fre-
et al.

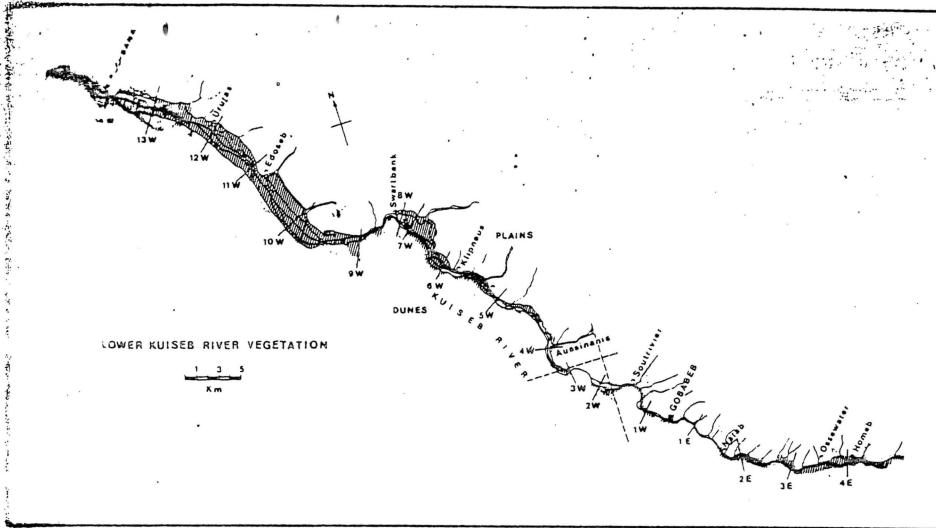


Figure 2. The vegetation of the Kuisieb River from Homeb to Rooibank occupies broad flood plains and is not confined to a narrow canyon as it is further upstream.

...). Thus, a regular surface flow of the Kuisieb River is necessary for maintenance of the river course itself and to support an associated fauna and flora. It also supports a kudu (*Oryx gazella*) population in years when fresh grasses are lacking (Hamilton et al. 1977).

Methods

Vegetation transects:

We selected cross sectional transects as a method to measure characteristics of the riverine vegetation (Phillips 1959) in 1972/73 (above Homeb) and 1973/74 (below Homeb to Rooibank). These transects were established perpendicular to the water course at approximately 5 km intervals on the lower Kuisieb River between Homeb (23° 18' S, 15° 09' E) and Rooibank (23° 12' S, 14° 39' E) (Fig. 2). Transects were numbered consecutively to the west and east of Gobabeb. The total area of vegetation downstream from Homeb is approximately 50 km² over a river distance of 85 km. Increased patchiness of the vegetation above Homeb necessitated more numerous transects in that part of the river system. Here, transects were surveyed at 0.5 km intervals over a river distance of 50 km. These transects were designated by distance in kilometres east of Gobabeb.

The Department of Water Affairs has designated three "Water Provinces" in the lower Kuisieb River based upon geological occurrences (L. W. R. Blom, pers. comm.). In the interval below Homeb almost an equal number of transects was surveyed in each of the three "Water Provinces". Transects 14W to 9W were in the lower province, transects 8W to 3W in the central province and transects 2W to 4E in the upper province of the

production at some sites. Three *Acacia erioloba* trees, two *A. albida* trees and one *Ficus sycomorus* tree were included in this analysis. Fruits of these two *Acacia* species were also censused on the transects below Homeb. Dry weight values for a one metre transect were calculated from average dry weight as determined above.

Animal Distribution:

In 1972/73, when this study was made, gemsbok and goats were the numerically dominant large mammal species. As an index of the distribution of space utilization by these two species, their faecal pellets were censused along a two metre wide path on each transect in the Kuiseb Canyon. All visible, non-bleached faecal pellets were considered and an estimate of the minimum total number to the nearest power of 10 was recorded. For example, all estimates from 1 000 to 9 999 were recorded as 1 000.

Nomenclature:

With the exception of *Acacia erioloba* (Ross 1975), which was used instead of *A. giraffae*, nomenclature in this paper was based upon "Prodromus einer Flora von Südwestafrika" by H. Merxmüller (1966-1972).

Results and Discussion

Vegetation Analysis:

The composition of the perennial woody vegetation of the Kuiseb River is not complex (Fig. 3). Only 8 species, in a total of 509 trees, occurred in the transects from Rooibank to Homeb. Their percent occurrence in this sample was: *Acacia erioloba* E. Meyer (Mimosaceae) 44%; *Acacia albida* Del. (Mimosaceae) 21%; *Tamarix usneoides* E. Meyer ex Bunge (Tamaricaceae) 12%; *Euclea pseudebenus* E. Meyer ex A. DC. (Ebenaceae) 12%; *Acanthosicyos horrida* Welw. ex Benth & Hooker fil. (Cucurbitaceae) 8%; *Salvadora persica* L. (Salvadoraceae) 2%; *Phoenix dactylifera* L. (Arecaceae) 0,8%; *Ficus sycomorus* L. (Moraceae) 0,4%. One *Maerua schinzii* Pax (Capparaceae) is known from the vicinity of Gobabeb, but did not appear in any transect.

Near Rooibank and Swartbank the palm has been introduced. All the other tree species are indigenous to southern Africa. With the exception of the nara, *Acanthosicyos horrida*, none of the species represented is a true desertic species. The nara occurs along the Kuiseb River from Gobabeb to the delta. Where the river is confined to a narrow course within the canyon the nara occurs on the upper banks only. Its range in places extends several kilometres south of the river into the dunes. Towards the delta, where the river ranges over several ill-defined courses, the nara occurs within the riverbed. Throughout its local range it is apparently dependent upon Kuiseb River ground water.

The percentage occurrence values in the transects from Homeb to 50 km upstream were: *S. persica* 36%, *A. albida* 30%, *T. usneoides* 20%, *A. erioloba* 10% and *E. pseudebenus* 4%. Neither *Ficus sycomorus* nor *F. cordata* Thunb. were encountered along any of the 105 transects above Homeb. A complete census of these trees along these 50 km located 56 *Ficus cordata* and 20 *F. sycomorus* individuals. Thus even the

se woody
1% of the
umilton. er
urveys in
changes.
ic animal

% of the
b (Fig. 4,
here was,
d). The
ion, bare
along the
ognizable
cts in the
% in the
nes (76%
vals may

72 E

manner.

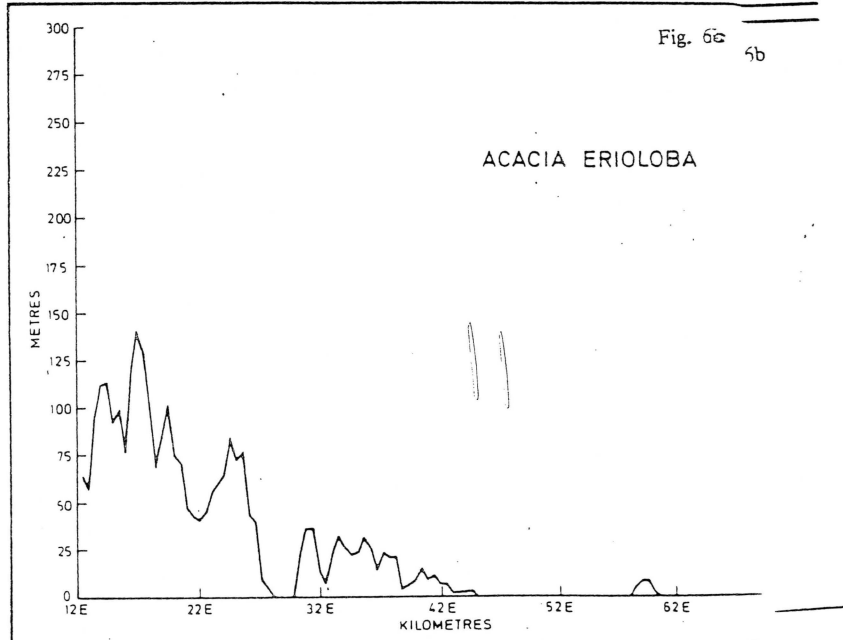
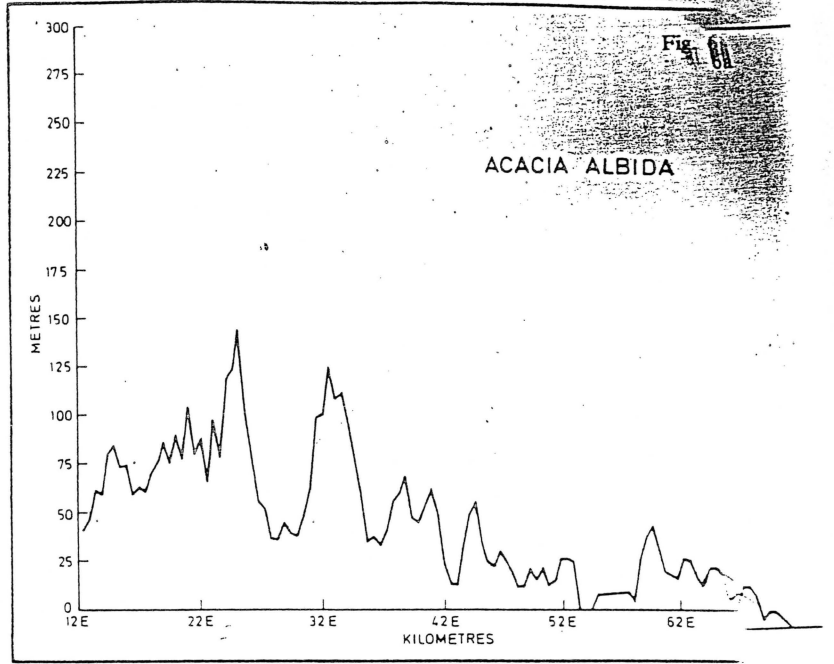


Figure 6. a, b, c, d. From Homeb upstream the reduced amount of vegetation was measured at frequent intervals. The total length of canopy of four common species is plotted against distance along the riverbed.

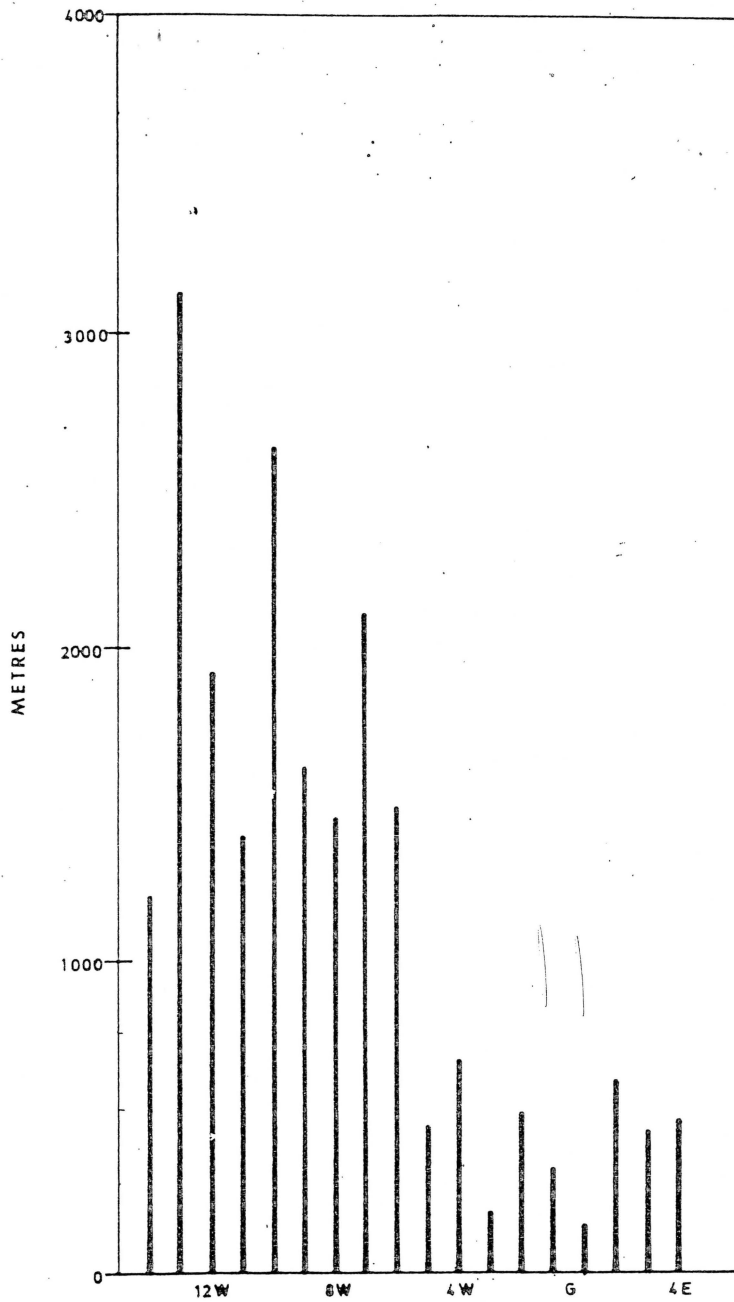


Figure 4. The length of the transects surveyed between Rooibank and Homeb (transects 14W to 4E) varied from a maximum of 3 130 metres to a minimum of 170 metres.

S. eenii (S. Moore) Merxm.
Tagetes minuta L.
Cichoriaceae
Launaea intybacea (Jacq.) Beauverd
Gramineae
Brachiaria glomerata (Hackel) A. Camus
Cynodon dactylon (L.) Pers.
Dactyloctenium aegyptium (L.) Beauv.
Eragrostis porosa Nees

E. trichophora Coss. & Dur.
Phragmites australis (Cav.) Steudel
Polypogon monspeliensis (L.) Desf.
Setaria verticillata (L.) Beauv.
Sporobolus consimilis Fresen.
Stipagrostis sabulicola (Pilger) De Winter
Cyperaceae
Cyperus marginatus Thunb.
Fimbristylis exilis (Humb., Bonpl. & Kunth)
Roemer & Schultes

Table 5

Occurrence of (A) *Euclea pseudebenus*, (B) *Acacia erioloba*, (C) *Ficus sycomorus* and (D) *Ficus cordata* from 20 km to 60 km above Gobabeb. Damage from browsing is estimated percent of woody material removed or killed by browsing. Unknown is dead limbs and trunks killed by shading, disease or flooding. Counts are complete above 40 km and include 20% of the vegetation from 20 to 40 km (calculated totals in parentheses).

	20–30	30–40	40–50	50–60 km
A. <i>Euclea pseudebenus</i>				
Distance				
Number of trees	(685)	(1445)	142	64
Unknown	8,4	9,6	12,75	17,1
Baboon	6,3	5,5	7,9	8,5
Gemsbok	0,9	5,5	1,4	2,5
B. <i>Acacia erioloba</i>				
Distance				
Number of trees	(400)	(670)	72	106
Unknown	17,2	16,1	9,6	0
Baboon	0	8,9	20,4	11,3
Gemsbok	0,9	2,3	0,7	0
C. <i>Ficus sycomorus</i>				
Distance				
Number of trees	0	2	13	5
Unknown		13	8,5	8,2
Baboon		0	2,1	0
Gemsbok		0	0	0
D. <i>Ficus cordata</i>				
Distance				
Number of trees	0	0	6	30
Unknown			18,3	17,0
Baboon			7,0	3,0
Gemsbok			0	0

Since Table 1 was compiled the Kuiseb flowed past Gobabeb as indicated:
1976/77: February – 2 days, March – 6 days
1977/78: February – 5 days, March – 2 days
1978/79: February – 5 days, March – 3 days
1979/80 and 1980/81: did not flow.

HANS-DETLEF MEBES

Zur Verbreitung und Öko-Ethologie des südwestafrikanischen Rosenpapageis *Agapornis roseicollis* (Vieillot)

Line Auswertung von Freilandbeobachtungen früherer Untersucher

Mit 5 Abbildungen und 2 Tabellen

Einleitung

Freilanduntersuchungen an Vertretern der Psittaciformes sind – mit Ausnahmen – in Australien – im Vergleich mit denen an anderen Vogelgruppen noch immer recht selten. Dies überrascht um so mehr, als viele Arten durch die Besonderheiten ihrer natürlichen Lebensweise als Kulturfolger und Schädiger gelten können.

Unter den vergleichsweise wenigen psittaciformen Species in Afrika (s. v. B. 1964) ist der im südwestlichen Teil dieses Kontinents vorkommende Rosenpapagei *Agapornis roseicollis* im phytopathologischen Schrifttum (z.B. Murton & W 1976, S. 130) neben anderen fehlenden Papageienarten erstaunlicherweise nicht erwähnt worden, obwohl maisanbauende Farmer im Territorium Südwestafrika seit Beginn der fünfziger Jahre „einen beachtlichen Teil ihrer Ernten an stetig wachsende Vernichtung durch Rosenpapageien“ einbüßen (Hoesch, 195 und man damit rechnen kann, daß die Behörden angesichts der großen Bedeutung dieses Getreides sowohl als Nahrung für die einheimische Bevölkerung und als Futtermittel als auch zur Äthanolherstellung aus Ernterückständen entsprechende Vorsorgemaßnahmen unterstützen würden.

In der zoogeographischen Literatur finden die Rosenpapageien dagegen eher Erwähnung. Doch fällt auf, daß sie in den meist nur feldornithologischen Arbeiten und Beschreibungen mit Angaben zu Fundort, Jahreszeit und Brutbiologie gleich mit anderen während zahlreicher Expeditionen beobachteten Vögeln kurz erwähnt werden.

Es wird deshalb im folgenden der Versuch gemacht, jene registrierten Fundorte und dokumentierten Freilandbeobachtungen zum Verhalten und zur Ökologie von *A. roseicollis* mit dem Ziel zusammenzufassen und zu diskutieren, die Vorbereitung von ökologischer Untersuchungen in den landwirtschaftlich bedeutsamen Gebieten

- KOCH, C. 1962: The Tenebrionidae of southern Africa. XXXI. Comprehensive notes on the tenebrionid fauna of the Namib Desert. *Ann. Transv. Mus.* 24:61-106.
- KOCH, C. 1963: An illustrated account of a major flood in the Kuiseb River. *Der Kreis* 6 (2/3):39-40.
- KÖHLER, O. 1969: Die Topnaar-Hottentotten am unteren Kuiseb. Dept. Bantu Admin. Devel. *Ethnol. Publs Rep. S. Afr.* 52:99-122.
- LOGAN, R. F. 1960: *The central Namib Desert, South West Africa*. Washington: National Academy of Sciences - National Research Council. Publication 758.
- MARKER, M. E. 1977: Aspects of the geomorphology of the Kuiseb River, South West Africa. *Madoqua* 10 (3):199-206.
- MARKER, M. E. & D. MÜLLER. 1978: Relict vlei silt of the middle Kuiseb River valley, South West Africa. *Madoqua* 11 (2):151-162.
- MARTIN, H. 1956: *Wenn es Krieg gibt, gehen wir in die Wüste*. Stuttgart: Union Deutsche Verlagsgesellschaft.
- MERXMÜLLER, H. (ed.). 1966-72: *Prodromus einer Flora von Südwestafrika*. München: Lehre.
- PALMER, E. & N. PITMAN. 1972: *Trees of Southern Africa*. Cape Town: Balkema. 3 vol.
- PHILLIPS, E. A. 1959: *Methods of vegetation study*. New York: Holt, Rinehart & Winston. Inc.
- PROZESKY, O. P. M. 1969: Notes on the daily drinking pattern of certain bird species. *Scient. Pap. Namib Desert Res. Stn* 45:69-81.
- ROSS, J. H. 1975: Notes on African *Acacia* species. *Bothalia* 11(4):443-447.
- RUST, U. & WIENEKE, F. 1974: Studies on gramadulla formation in the middle part of the Kuiseb River, South West Africa. *Madoqua* Ser. 2, 3:5-15.
- SFELY, M. K. 1973: Life-sustaining Kuiseb River. *S.W. Afr. Annual* 1973:153-157.
- STENGEL, H. 1964: The rivers of the Namib and their discharge into the Atlantic. Part I: Kuiseb and Swakop. *Scient. Pap. Namib Desert Res. Stn* 22:1-50.
- STUART, C. T. 1975: Preliminary notes on the mammals of the Namib Desert Park. *Madoqua* Ser. 2, 4:5-68.
- WICKENS, G. E. 1969: A study of *Acacia albida* Del. (Mimosoideae). *Kew Bull.* 23(2):181-202.

Table 1 - Kuiseb Floods at Gobabeb 1963-1976

Year	Days per Month of Flooding					Total days for season
	Dec	Jan	Feb	Mar	Apr	
1962/63	0	25		25	16	68
1963/64			no record			
1964/65	0	2	11	3	10	26
1965/66	0	0	10	8	0	18
1966/67	0	0	10	12	0	22
1967/68	10	0	1	0	0	11
1968/69	2	0	1	14	1	18
1969/70	0	0	0	1	0	1
1970/71	0	0	23	5	6	34
1971/72	0	8	0	13	22	43
1972/73	0	0	0	5	10	15
1973/74	0	13	28	31	30	102
1974/75	0	0	0	10	0	10
1975/76	0	11	16	19	15	61
Average ¹	0,92	4,54	7,85	11,23	8,46	33,0
Variability ²	302%	170%	122%	83%	117%	87%
Percent of days with flooding	3%	15%	28%	36%	28%	22%
Years of flow	2	5	9	12	8	11
Percent of years with flooding	15%	38%	69%	92%	62%	100%

¹ Average number of days per month the river has flowed.

² S.D./Average X 100

Table 2 - Percent canopy width of each tree species measured in the three "Water Provinces" adjusted for unequal transect lengths

	Lower Water Province	Middle Water Province	Upper Water Province
<i>Acacia albida</i>	10%	25%	66%
<i>Acacia erioloba</i>	13	46	41
<i>Euclea pseudobenus</i>	2	26	72
<i>Tamarix usneoides</i>	1	24	74
<i>Salvadora persica</i>	6	10	84
<i>Ficus sycomorus</i>	17	83	0
<i>Phoenix dactylifera</i>	100	0	0
<i>Acanthosicyos horrida</i>	73	27	0

GRAMS DRY WEIGHT .POD PRODUCTION

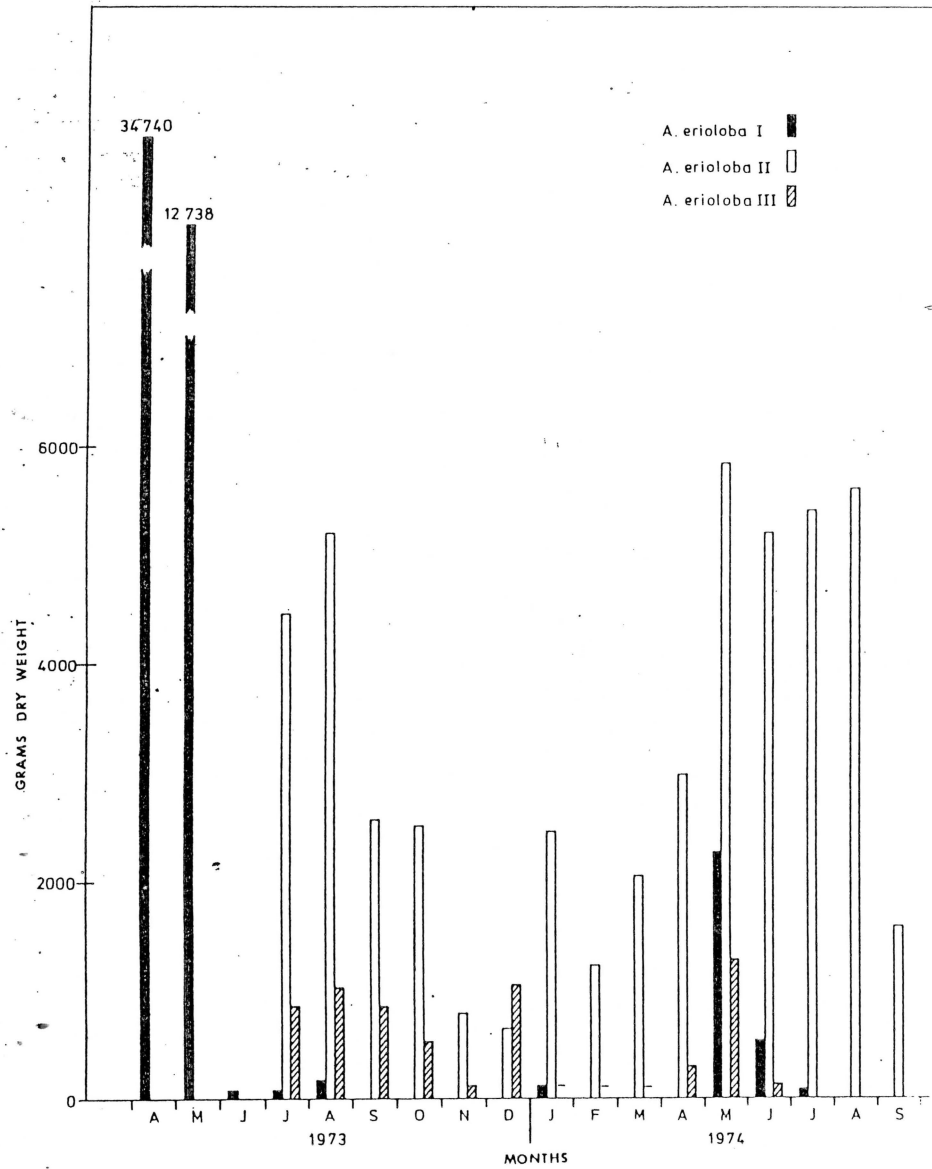


Figure 12. Dry weight of pod production of three *Acacia erioloba* trees situated at varying distances from the water course at Gobabeb.

GRAMS DRY WEIGHT .POD PRODUCTION

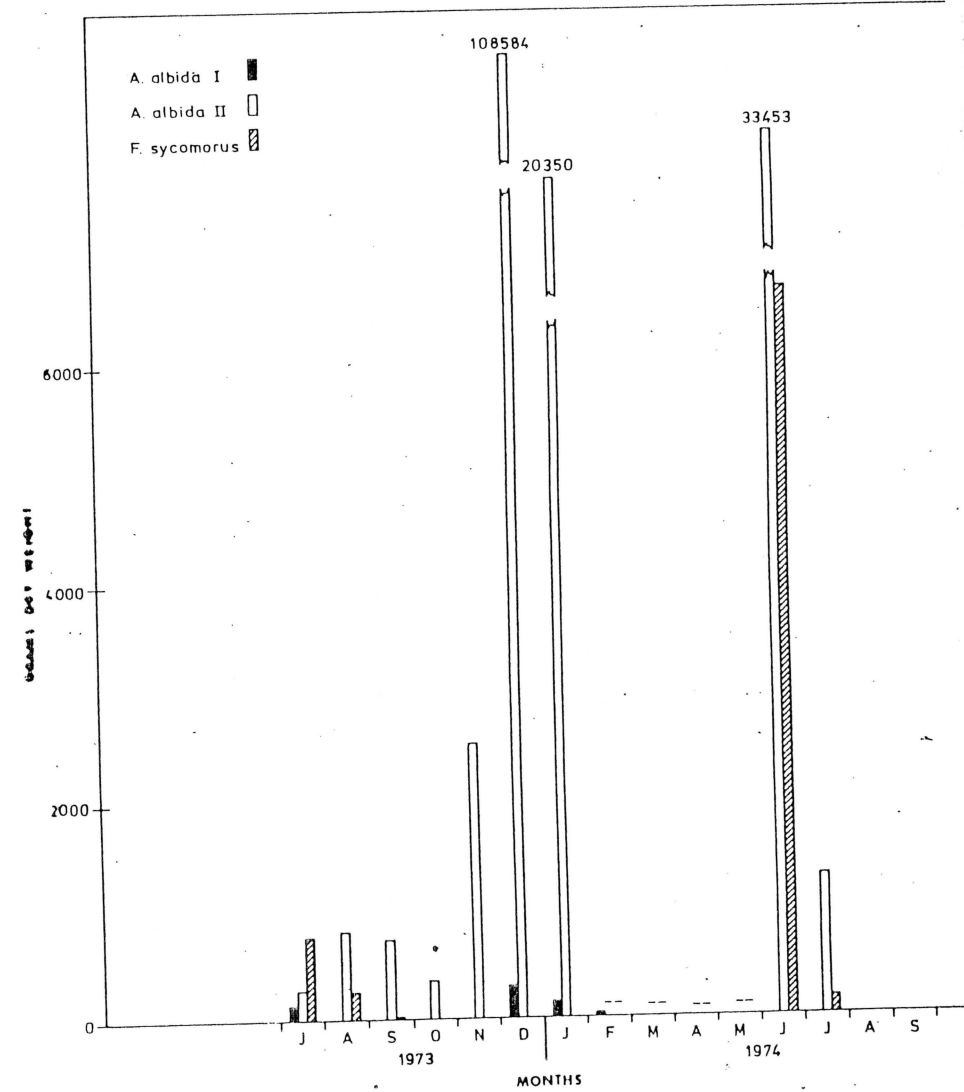


Figure 13. Dry weight of pod production of two *Acacia albida* trees and fruit production of one *Ficus sycomorus* tree at Gobabeb.

