198 JOURNAL XXXIV/XXXV - SWA Wissenschaftliche Gesellschaft Journal of the South West Africa Journal of the South West Africa J. BUSKIRK, WJ. HAMILTON, III Scientific Society 1980 3 大田町町三日本町三日町町 MARY K. SEELY, W.H. BUSKIRK, W.J. HAMILTON, III & J.E.W. DIXON 35:5 Lower Kuiseb River Perennial **Vegetation Survey** D.R.F.N REFERENC (5 Tables, 15 Figures) LIBRARY

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

Abstract

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Contents

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 are 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 albuda, Acacia erioloba, Tamarix usneoides, Euclea pseudebenus, Salvadora persica, Phoenix dactylifera, Ficus sycomorus, Ficus cordata, Maerua schinzii and Acanthosicyos horrida. Their number and canopy





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The vegetation of the Kuiseb 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 Kuiseb River is necessary for maintenance of are over course itself and to support an associated fauna and flora. It also supports a how (Oryx gazella) population in years when fresh grasses are lacking (Hamilton 4. 1977).

HELMAIS

regetation transects:

Accelerated cross sectional transects as a method to measure characteristics of the exercise vegetation (Phillips 1959) in 1972/73 (above Homeb) and 1973/74 (below Homeb to Rooibank). These transects were established perpendicular to the water and se at approximately 5 km intervals on the lower Kuiseb River between Homeb (23° 14'S, 15° 09'E) and Rooibank (23° 12'S, 14° 39'E) (Fig. 2). Transects were numbered accutively to the west and east of Gobabeb. The total area of vegetation downactam from Homeb is approximately 50 km² over a river distance of 85 km. Increased atchiness of the vegetation above Homeb necessitated more numerous transects in and part of the river system. Here, transects were surveyed at 0,5 km intervals over a aver distance of 50 km. These transects were designated by distance in kilometres east 4 Gobabeb.

The Department of Water Affairs has designated three "Water Provinces" in the lower Kusseb River based upon geological occurrences (L. W. R. Blom, pers. comm.). In the energy al below Homeb almost an equal number of transects was surveyed in each of the ince "Water Provinces". Transects 14W to 9W were in the lower province, transects 1W to 3W in the central province and transects 2W to 4E in the upper province of the





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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. girafjue*, 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 Bentham & 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

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orus fruit thly from ed, and a le Kuiseb ce of fruit





1977/78: February - 5 days, March - 2 days 1978/79: February - 5 days, March - 3 days

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1979/80 and 1980/81: did not flow.

Gemsbok Baboon Unknown Number of trees Distance Ficus cordata Gemsbok Baboon Unknown Number of trees Ficus sycomorus Gemsbok Distance Baboon Unknown Number of trees Distance Acacia erioloba Gemsbok Baboon Unknown Number of trees 20-30 20-30 20-30 (400) 0 8,4 6,3 0,9 0 0,9 30-40 30-40 (670) 30-40 16,1 8,9 2,3 5,5 0 2 0 0 40-50 40-50 40-50 18,3 12,75 20,4 8,5 2,1 13 0 6 9,6 72 7,9 50-60 km E 17,0 50-60 km E 50-60 km F 8,2 17.1 11,3 S 106 0 3.0 30 0 0 0 0 64 2.5

0

Since Table 1 was compiled the Kuiseb flowed past Gobabeb as indicated:

1976/77: February - 2 days, March - 6 days

D

Gramineae

Eragrostis porosa Nees

Stipagrostis sabulicola (Pilger) De Winter Sporobolus consimilis Fresen Setaria verticillata (L.) Beauv Polypogon monspeliensis (L.) Desf. Phragmites australis (Cav.) Steudel E. trichophora Coss. & Dur

Cyperaceae

Fimbristylis exilis (Humb., Bonpl. & Kunt) Cyperus marginatus Thunb Roemer & Schultes

Table 5

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

Line Auswertung von Freilandbeobachtungen früherer Untersucher

Wat 5 Abbildungen und 2 Tabellen)

enigen Forschungsprogrammen in Australien -- im Vergleich mit denen an Freilanduntersuchungen an Vertretern der Psittaciformes sind – mit Ausnal

Einleitung

scienarten durch die Besonderheiten ihrer natürlichen Lebensweise als Kultur Vogelgruppen noch immer recht selten. Dies überrascht um so mehr, als vie

Unter den vergleichsweise wenigen psittaciformen Species in Afrika (s. v. Be

schädiger gelten können.

roseicollis (Vieillot)

Euclea pseudebenus

Distance

(685) 20-30 (1445) 30-40 40-50 142 50-60 km ł

wähnt worden, obwohl maisanbauende Farmer im Territorium Südwesta Agapornis roseicollis im phytopathologischen Schrifttum (z.B. Murton & W 1/1964) ist der im südwestlichen Teil dieses Kontinents vorkommende Rose 1976, S. 130) neben anderen fehlenden Papageienarten erstaunlicherweise nic

dig wachsende Vernichtung durch Rosenpapageien" einbüßen (Hoesch, 195 mibia seit Beginn der fünfziger Jahre "einen beachtlichen Teil ihrer Ernten at dieses Getreides sowohl als Nahrung für die einheimische Bevölkerung un und man damit rechnen kann, daß die Behörden angesichts der großen I sches Futtermittel als auch zur Athanolherstellung aus Ernterückständer chende Vorsorgemaßnahmen unterstützen würden.

In der zoogeographischen Literatur finden die Rosenpapageien dagegen eh und Beschreibungen mit Angaben zu Fundort, Jahreszeit und Brutbiolog sichtigung. Doch fällt auß, daß sie in den meist nur feldornithologischen A gleich mit anderen während zahlreicher Expeditionen beobachteten Vog

ökologischer Untersuchungen in den landwirtschaftlich bedeutsamen Gebit mit dem Ziel zusammenzufassen und zu diskutieren, die Vorbereitung (mentierten Freilandbeobachtungen zum Verhalten und zur Ökologie von AEs wird deshalb im folgenden der Versuch gemacht, jene registrierten Funde kurz erwähnt werden.

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ANNS-DETLEF MEBES

südwestafrikanischen Rosenpapageis Agapornis Zur Verbreitung und Oko-Ethologie des

S. eenii (S. Moore) Merxm

Launaea intybacea (Jacq.) Beauverd

Cynodon dactylon (L.) Pers.

Brachiaria glomerata (Hackel) A. Camus

Dactyloctenium aegyptium (L.) Beauv

Tagetes minuta L.

Cichoriaceae

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flooding flooding years with Percent of Years of flow days with Percent of Variability Average¹ 1975/76 1974/75 1973/74 1972/73 1971/72 1970/71 1969/70 1968/69 1967/68 1966/67 Year 1965/66 1964/65 1963/64 1962/6 Table 1 - Kuiseb Floods at Gobabeb 1963-1976 302% 15% 0,92 0 0 0 0 0 0 0 3% 0 0 0 Dec 0 0 38% 170% 15% 5 4,54 = 13 Days per Month of Flooding 0 0 8 0 Jan 0 0 0 0 25 0 no record 122% 69% 28% 9 16 0 0 28 23 7,85 Feb 0 10 10 Ξ 2 92% 83% 36% 11,23 12 19 10 31 Mar S 3 25 14 0 62% 117% 28% 8 8,46 15 22 10 30 6 Apr 0 0 16 0 0 for sensen Total day 1()()" 102 ----11.1 22" 874 61 10 5 11 ---オニド 1.4 20 5.2

² S.D./Average X 100 Average number of days per month the river has flowed

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

for unequal transect lengths

Acanthosicyos horrida Phoenix dactylifera ricus sycomorus Salvadora persica Euclea pseudebenus Acacia erioloba **Famarix** usneoides Acacia albida Province Water 1 6 17 100 73 Lower 10% 13 2 Province Water Middle 26 24 10 83 27 25% 46 Province Water Upper 66% 41 84 74 72 0

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