

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/30510747>

Invasive alien organisms in South West Africa/Namibia

Article

Source: OAI

CITATIONS

12

READS

159

3 authors, including:



Cj Brown

Namibian Chamber of Environment

12 PUBLICATIONS 383 CITATIONS

SEE PROFILE



Ian A W Macdonald

47 PUBLICATIONS 1,517 CITATIONS

SEE PROFILE

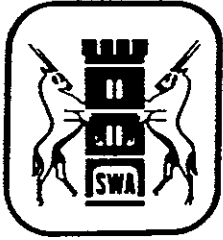
Some of the authors of this publication are also working on these related projects:



South African contribution to the SCOPE Project on the Ecology of Biological Invasions [View project](#)



Conservation implications of the invasion of southern Africa by alien organisms [View project](#)



Invasive alien organisms in South West Africa/Namibia

Edited by C J Brown, I A W Macdonald and S E Brown

This report results from a workshop organized by the Directorate of Nature Conservation and Recreation Resorts in Windhoek, and is produced in conjunction with the Council for Scientific and Industrial Research

A report of the National Programme for Environmental Sciences

Produced as part of the South African contribution to the international SCOPE project on the Ecology of Biological Invasions

SOUTH AFRICAN NATIONAL SCIENTIFIC PROGRAMMES REPORT NO

119

(ii)

Issued by
Foundation for Research Development*
Council for Scientific and Industrial Research
P O Box 395
PRETORIA
0001

from whom copies of reports in this series are available on request

Printed in 1985 in the Republic of South Africa

ISBN 0 7988 3800 0

Editors' addresses:

Mr C J Brown
Directorate of Nature Conservation and Recreation Resorts
Private Bag 13306
WINDHOEK
9000

Mr I A W Macdonald
Percy FitzPatrick Institute of African Ornithology
University of Cape Town
RONDEBOSCH
7700

Mrs S E Brown
South West Africa Herbarium
Directorate of Agriculture and Forestry
Private Bag 13184
WINDHOEK
9000

*previously Cooperative Scientific Programmes

CHAPTER 4 INVASIVE ALIEN PLANTS IN THE WATERBERG PLATEAU PARK

R W Jones and W Jankowitz

INTRODUCTION

The Waterberg Plateau Park (40 549 ha) is situated approximately 65 km east of Otjiwarongo. The Park (previously farmland) was proclaimed in 1972, and since then a close watch has been kept on any invasive plants occurring within its boundaries. The Waterberg mountain plateau rises about 420 m above the surrounding plains at its south-western and northern sides, and slopes gently down into the surrounding area to the north-east. The plateau is circumscribed by sandstone cliffs of varying height. The plateau has a deep, continuous reddish sand layer. Below the cliffs is a fairly even slope to the base of the mountain, covered by sandstone rocks weathered from the summit. The vegetation on the summit is an extension of the woodland flora while the surrounding plains are mainly Acacia savanna. The annual rainfall is about 460 mm. The bioclimatic characteristics of the region are described in detail by Jankowitz (1983).

Invasive alien plants occurring in this region are Datura ferox, Lantana camara, Melia azedarach, Opuntia ficus-indica and Ricinus communis.

SPECIES ACCOUNTS

Datura ferox (Map 7). This is the only invasive alien plant which has to date been located on the plateau. Little is known about the history of this plant in the area, but it is thought to have been introduced during the farming era. At present it is found in a few disturbed places over a total area of about 75 m². Potential habitat of this species is confined to the disturbed areas, eg along firebreaks and around water points. Its rate of spread over these areas is rapid after any period of high rainfall. Until now its ecological impact appears to have been slight, largely due to the fact that the plant is confined to bare, sandy areas which have already been ecologically disturbed, but it probably competes with indigenous pioneer species.

D ferox is relatively easy to control manually although the process is time consuming. At present plants are removed whenever they are encountered, and normally prior to seeding.

Lantana camara (Map 11). This species has only been recorded to date in the Okatjikona region of the Park. This is a small section of old farmland

at the base of the plateau, which was overutilized in the past. L. camara was planted in the garden of the farm Okatjikona during the first half of the century. It subsequently spread, mainly through the agency of frugivorous birds, beyond the garden. The area infested is at present about four hectares in extent. The current rate of spread is slow, but under more favourable climatic conditions this could accelerate. The potential habitat of this species in the area is estimated at 15 ha.

This species competes aggressively with indigenous plants, particularly for moisture. Various methods of control have been attempted in the past, but this has proved to be extremely difficult.

Melia azedarach (Map 12). This species was originally introduced to the area by farmers during the first half of the century. At present it occurs over an area of about 600 m² at Rodenstein (at the base of the plateau). The area suitable for potential infestation extends over about 2,25 km².

This species is thought to compete for moisture with indigenous species such as Ficus sycomorus, Rhus lancea and others. At present the ecological impact of this invader is minimized as it is removed wherever possible. The rate of spread is slow but under more favourable climatic conditions it could be expected to accelerate. Eradication of this species is difficult and only chemical or mechanical means offer possibilities at this stage. Manual removal is difficult as the roots penetrate rocky areas and may grow through cracks in rocks.

Opuntia ficus-indica (Map 14). This species is located mainly along the scree at Rodenstein. It was originally planted in the area by farmers who moved into the region around 1907. The species was planted for its fruit and for the cold drink syrup which can be made from it. This species spread dramatically over large areas until 1980, when biological control measures, employing cochineal Dactylopius opuntiae, were initiated. The cochineal has spread fairly effectively and has both checked the spread of the cactus and killed off several hectares of existing stands of the invader. The area currently infested is about 10 ha in extent, but is at present decreasing.

It is of vital importance that a close check be kept on this species as the possible extent of infestation is great. The area of potential habitat (rocky areas along the scree) totals approximately 15 000 ha. This plant encroaches aggressively on indigenous vegetation and competes for water and nutrients. The impact on the ecosystem were this species allowed to get out of control would be extensive.

Ricinus communis (Map 16). This species is found at Rodenstein, mainly along the scree and in the vicinity of the fountains which occur in the area. It is not known when and by whom this species was originally brought into the area, but it was possibly introduced in cattle feed. The area at present infested is about 150 m² in extent. The spread of this species in this area is restricted as it is confined to areas of high moisture and shade. The plant can be removed manually with relative ease, although this process is time consuming. Whenever encountered in the park it is immediately removed. Its invasive potential in this area is not high.

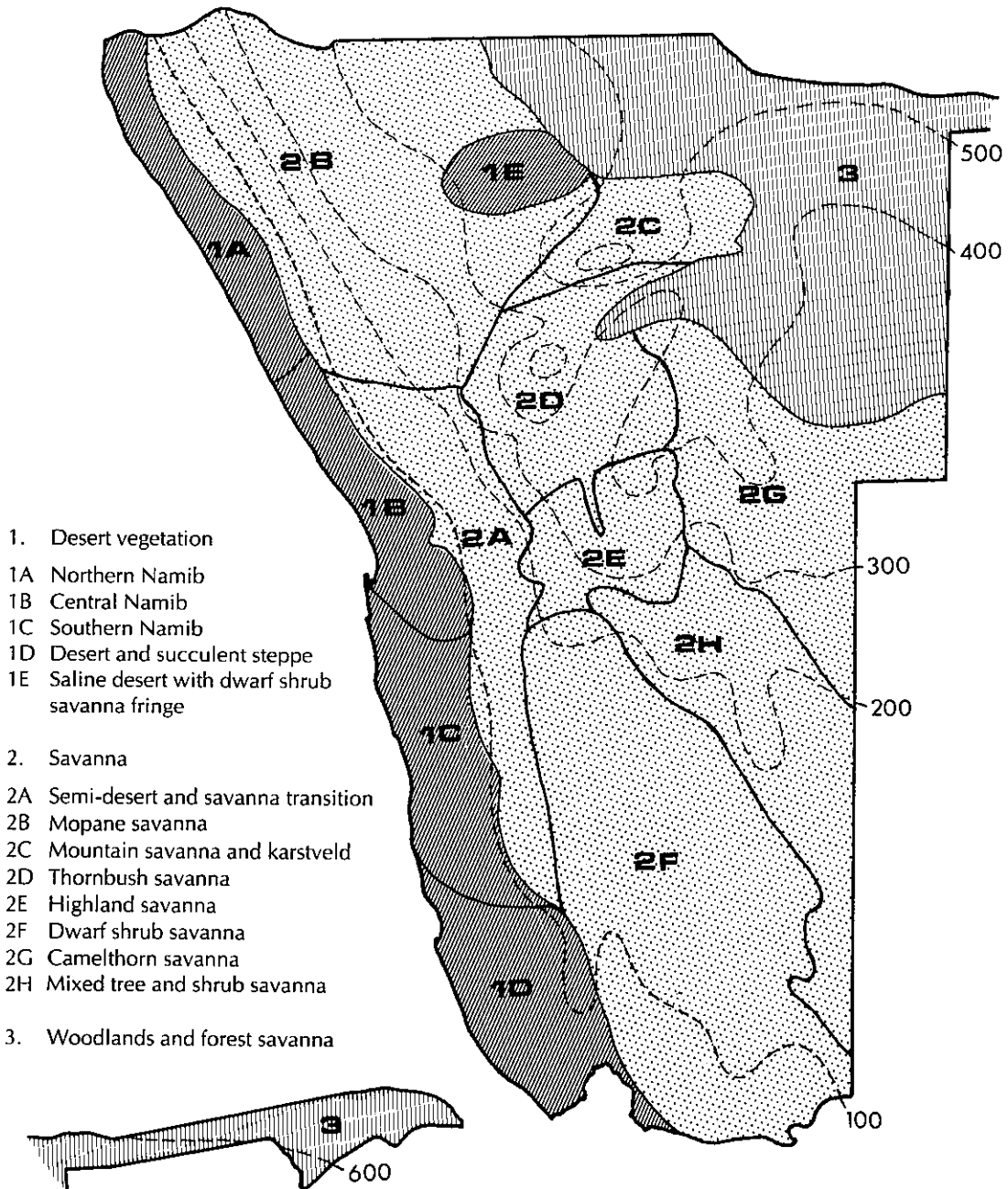
DISCUSSION AND SUMMARY

At present there are no major problems with invasive alien plant species within the park. Those species which do occur are under satisfactory control. Effective control of Opuntia species is possible using cochineal. The Lantana camara infested area will be controlled chemically at the earliest opportunity when climatic conditions are favourable, as will the Melia azedarach infestations. Mechanical methods (largely manual), although time consuming, will need to be continually implemented to prevent any of the other invasive species in the area from getting out of control.

The long history of occupation of some of the old homesteads in the park, together with the large variety of alien plant species that were introduced has led to a situation where park managers will have to be on the look out for new alien plant problems. Recently a hitherto unrecorded invasive alien plant for SWA/Namibia, Cardiospermum grandiflorum, was recorded from the park (Macdonald and Nott in press). This species was found growing over a few trees at Rodenstein. It has since been removed and destroyed. Little is known about the invasive potential of this plant in an area such as Waterberg, but it has caused considerable ecological damage in Natal, and efforts will be made to ensure that it does not become established in this area.

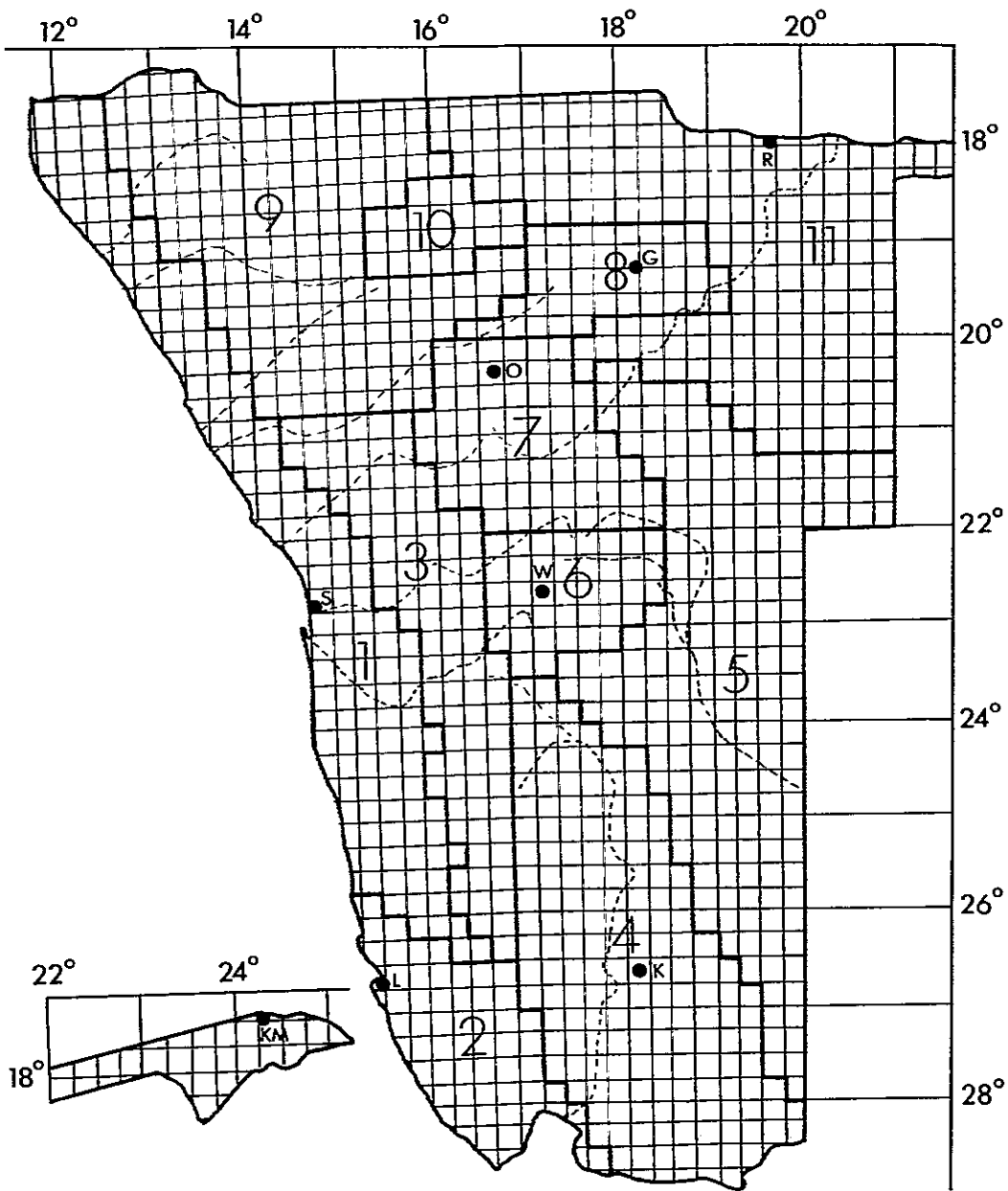
It is apparent that the occurrence of the various invasive species in the area can be attributed to farmers in the early half of the century, who were certainly unaware of the potential problems that these plants can cause.

MAP 1. The vegetation zones (after Giess 1971) and the mean annual rainfall isohyets in South West Africa/Namibia.

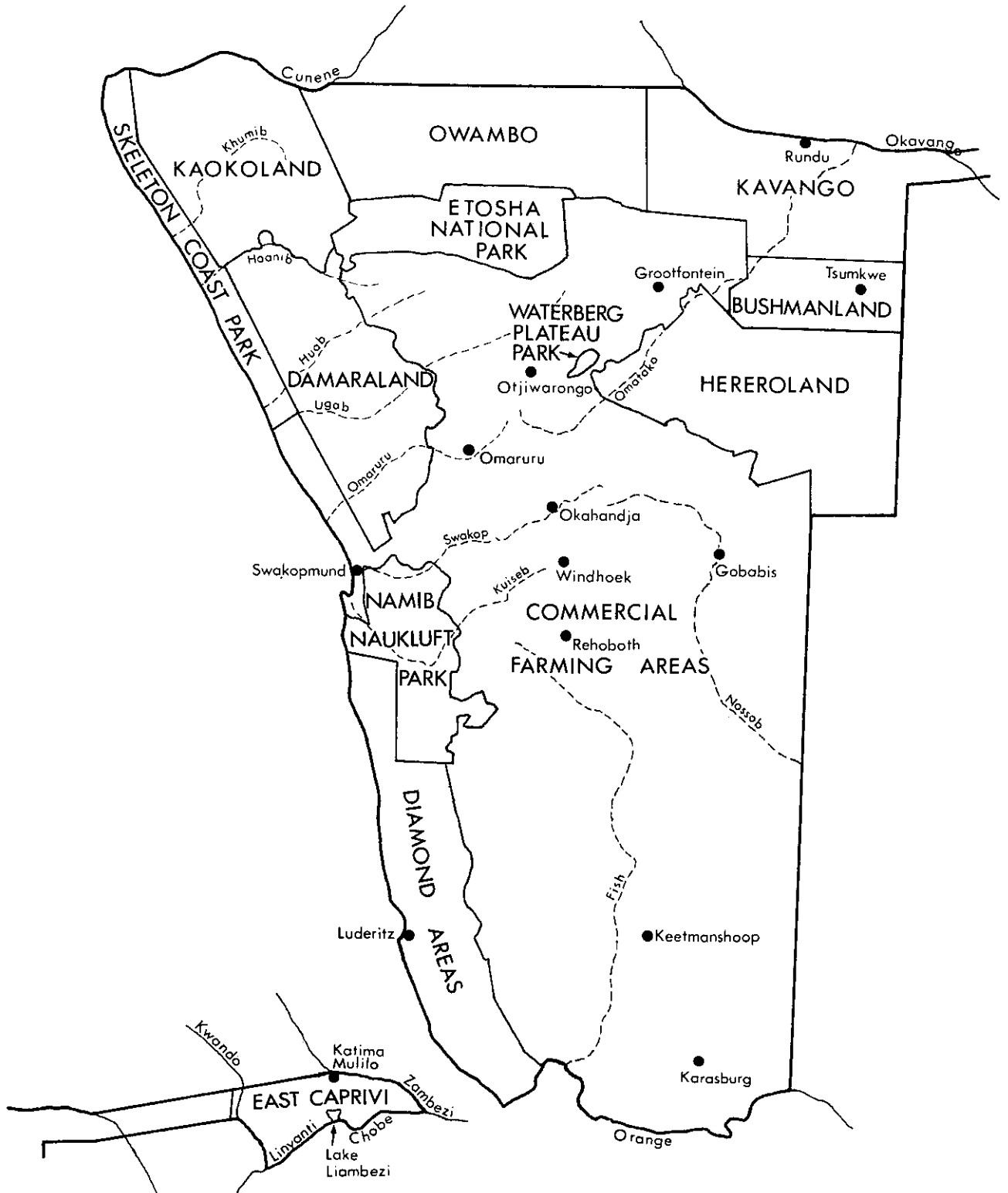


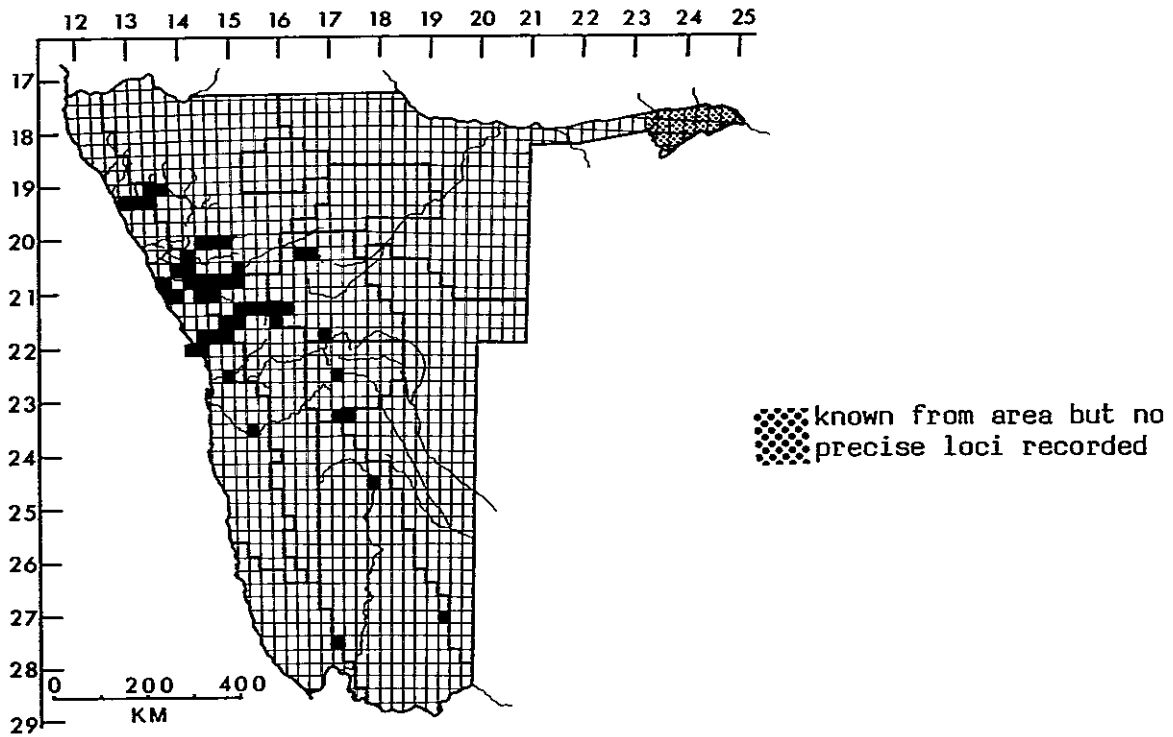
MAP 2. Bioclimatic map showing regions, quarter-degree squares, major rivers and major towns.

- Region 1 Namib Desert, summer rainfall; 50 mm
- 2 Namib Desert, winter rainfall; 50 mm
- 3 Semi-desert and savanna transition; 50-150 mm
- 4 Dwarf shrub savanna; 50-200 mm
- 5 Kalahari Acacia savanna; 150-400 mm
- 6 Highland savanna; 250-400 mm
- 7 Thornbush savanna; 350-450 mm
- 8 Mountain savanna; 450-600 mm
- 9 Mopane savanna; 100-400 mm
- 10 Saline pans with dwarf shrub fringe
- 11 Forest savanna and woodland; 400-700 mm

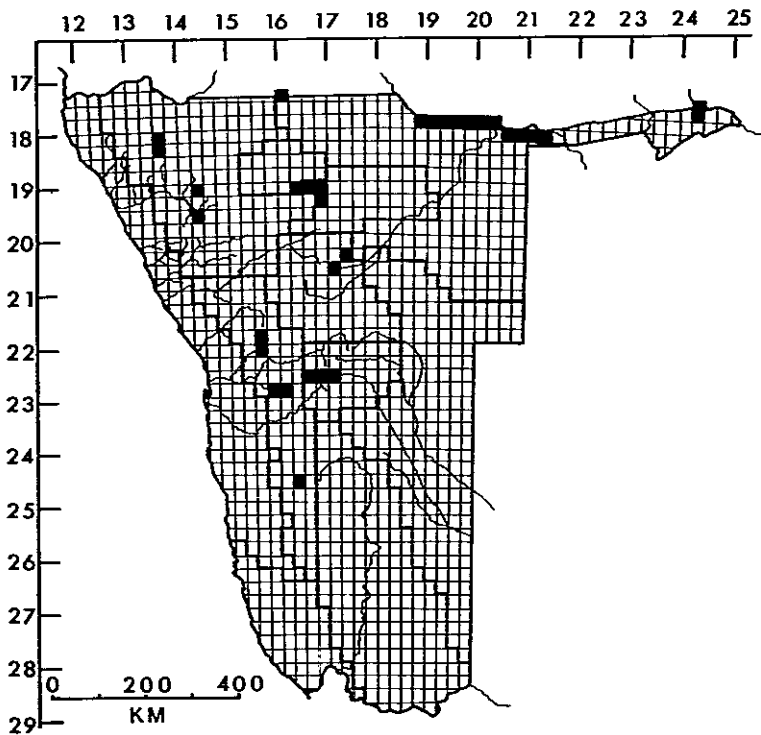


MAP 3. South West Africa/Namibia showing main place names mentioned in text.

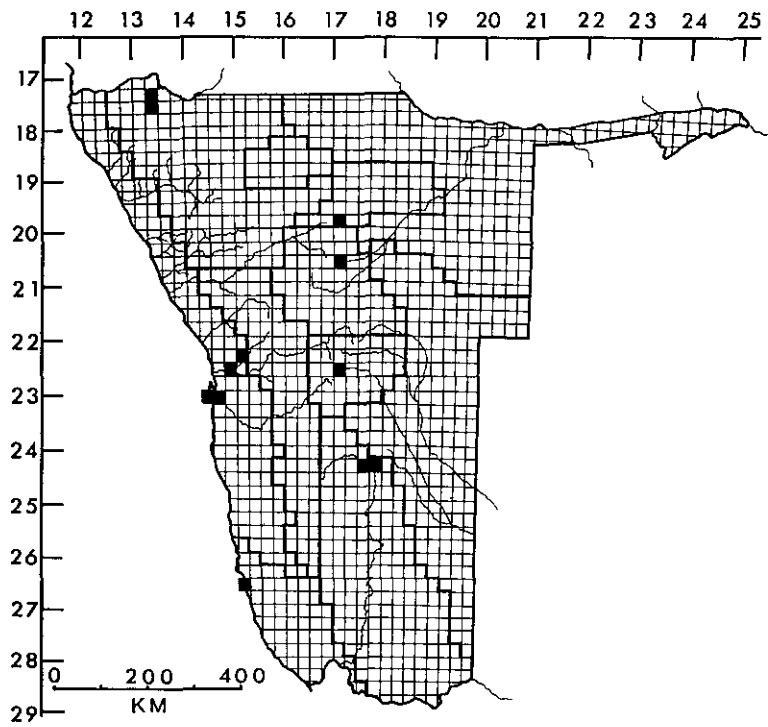




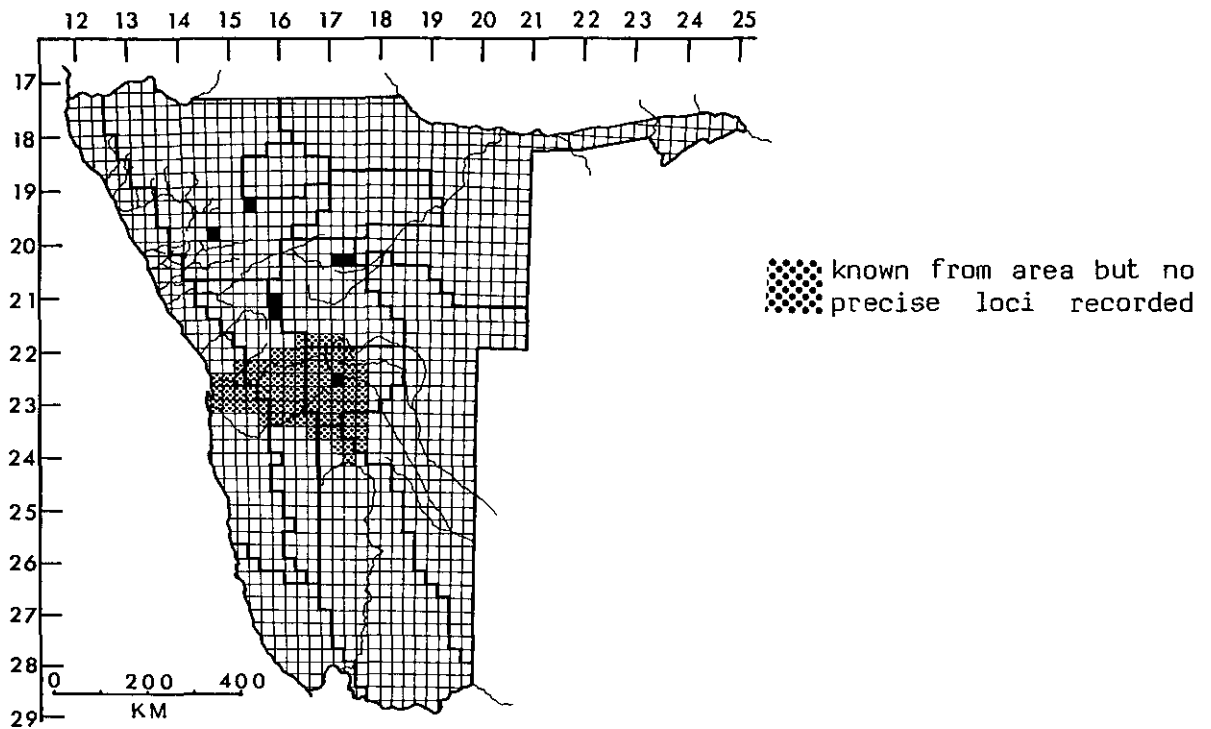
MAP 4. Distribution map of Argemone ochroleuca.



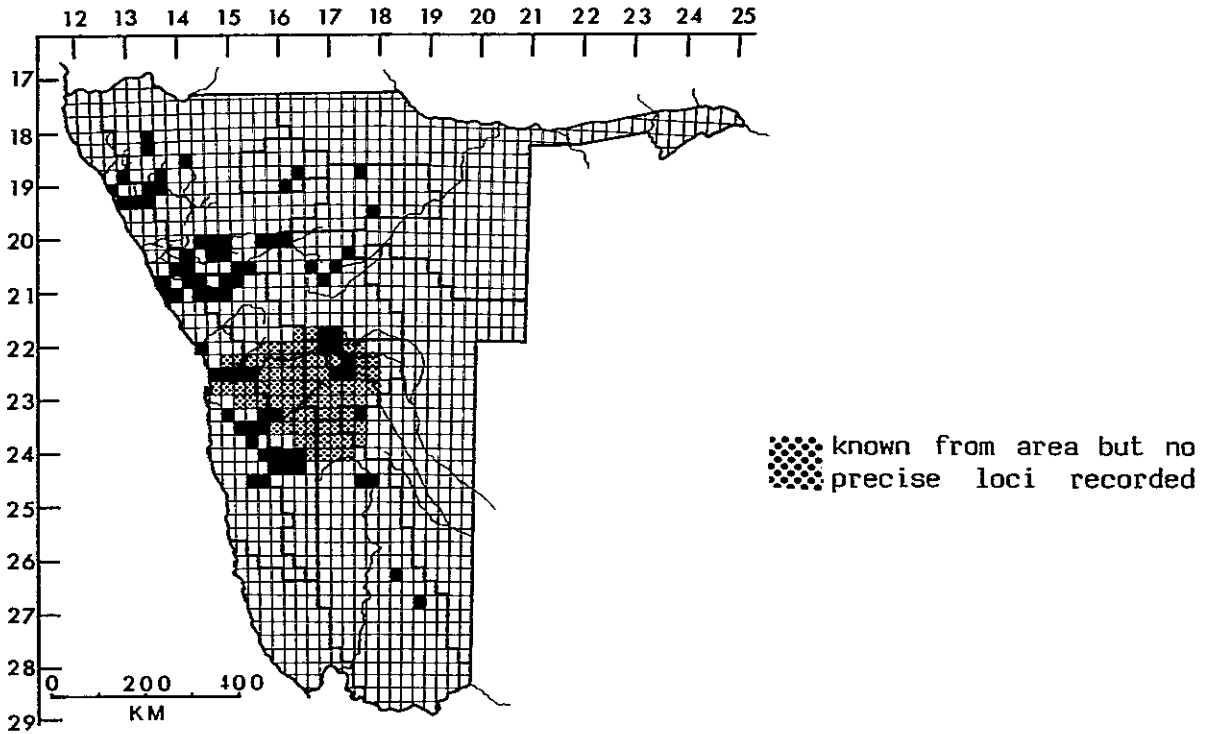
MAP 5. Distribution map of Bidens biternata.



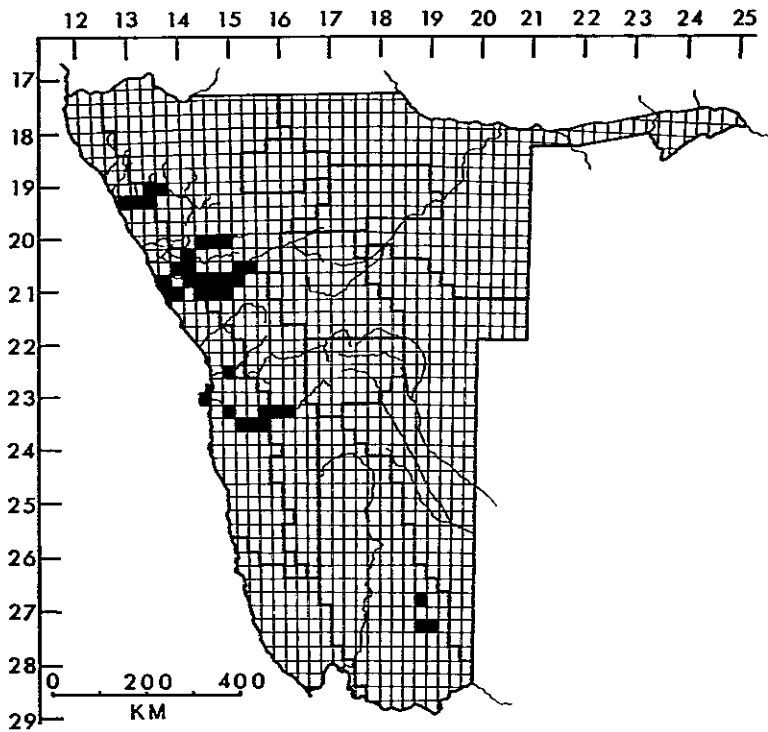
MAP 6. Distribution map of Chenopodium ambrosioides.



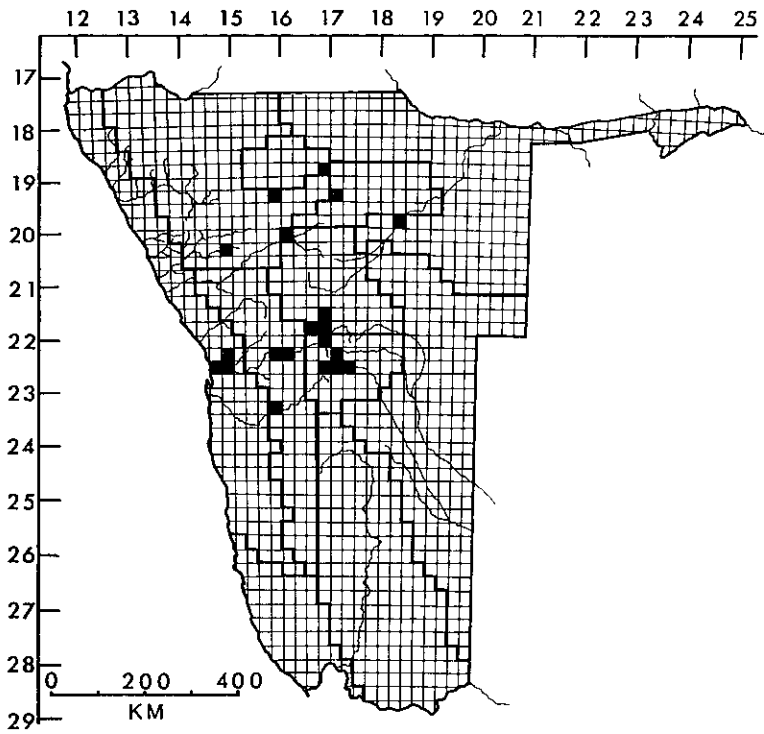
MAP 7. Distribution map of Datura ferox.



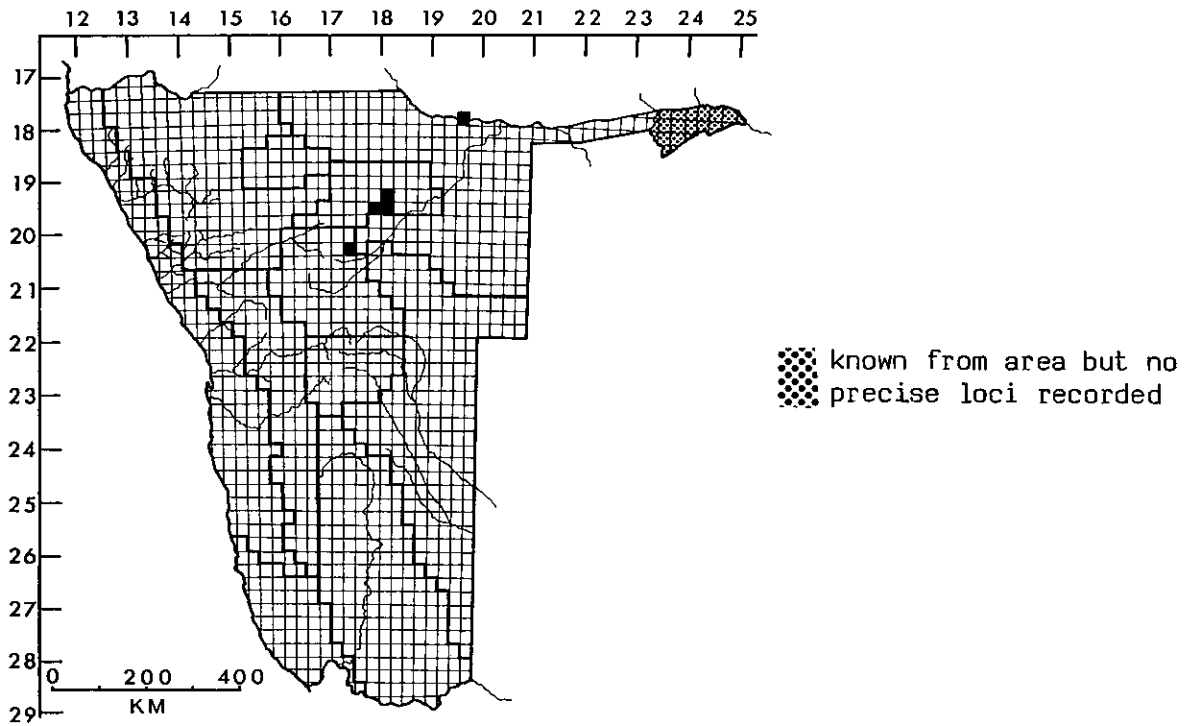
MAP 8. Distribution map of Datura innoxia.



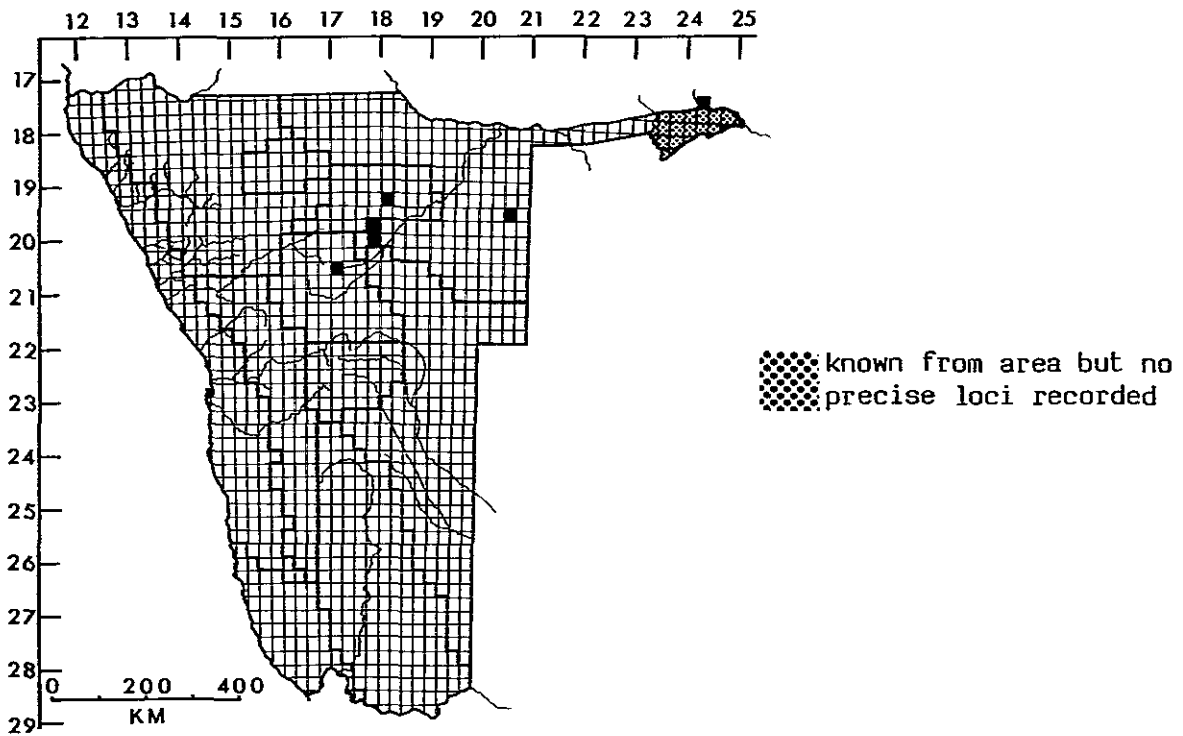
MAP 9. Distribution map of Datura stramonium.



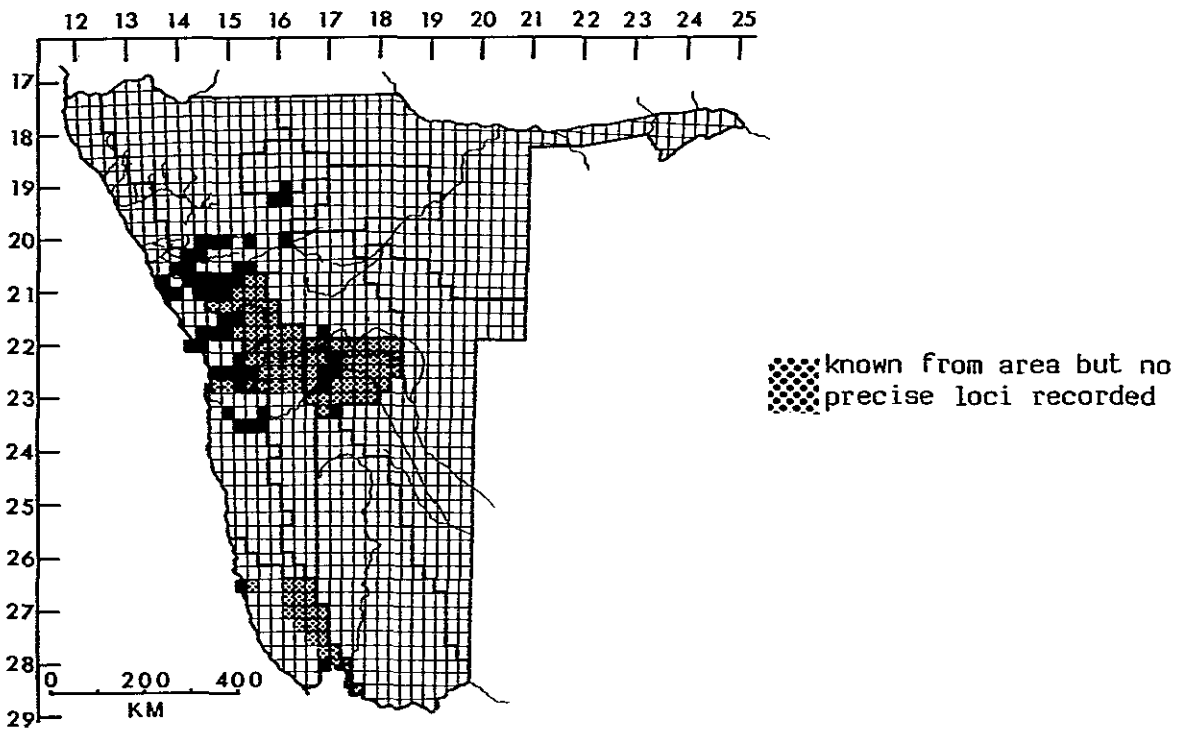
MAP 10. Distribution map of Flaveria bidentis.



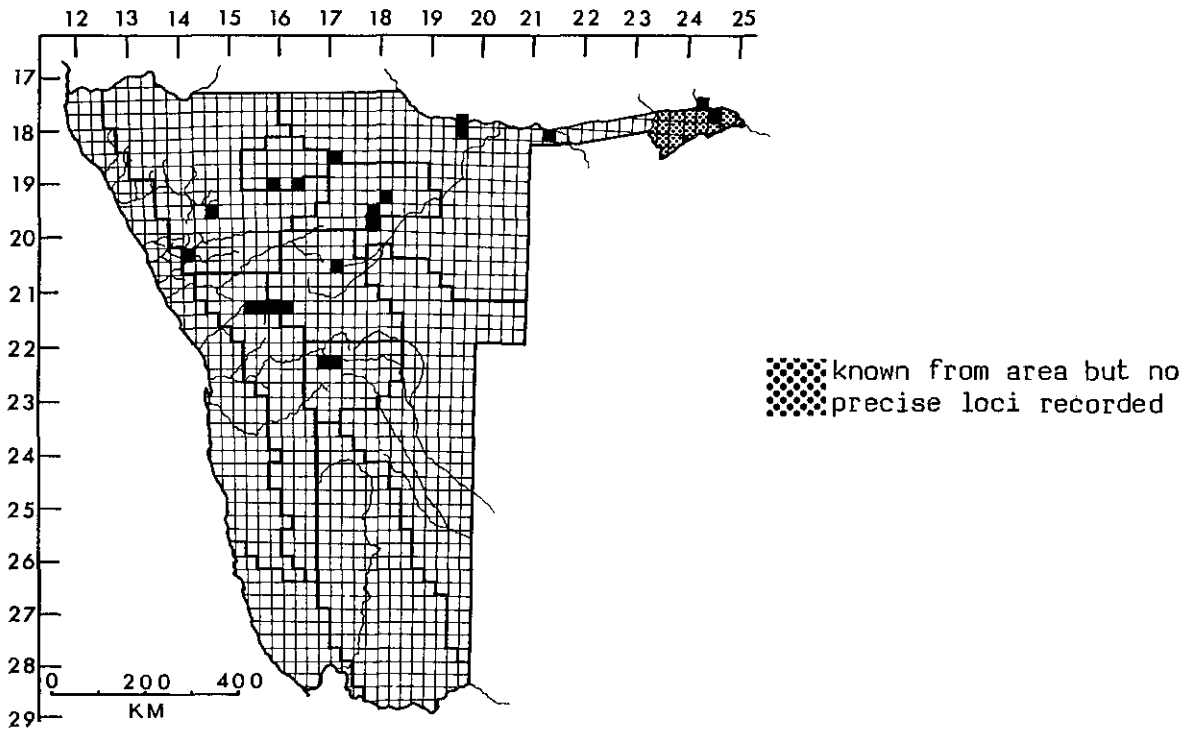
MAP 11. Distribution map of Lantana camara.



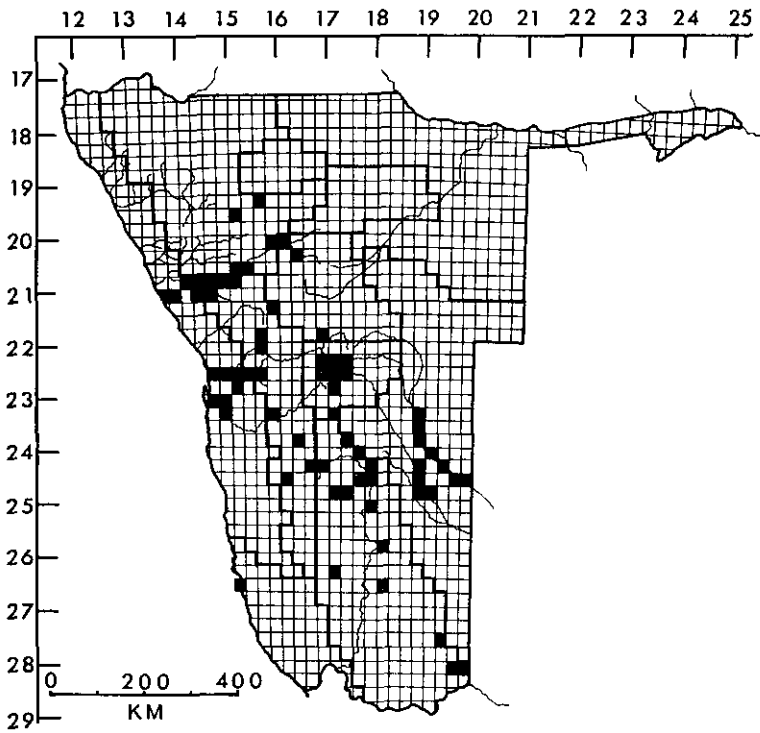
MAP 12. Distribution map of Melia azedarach.



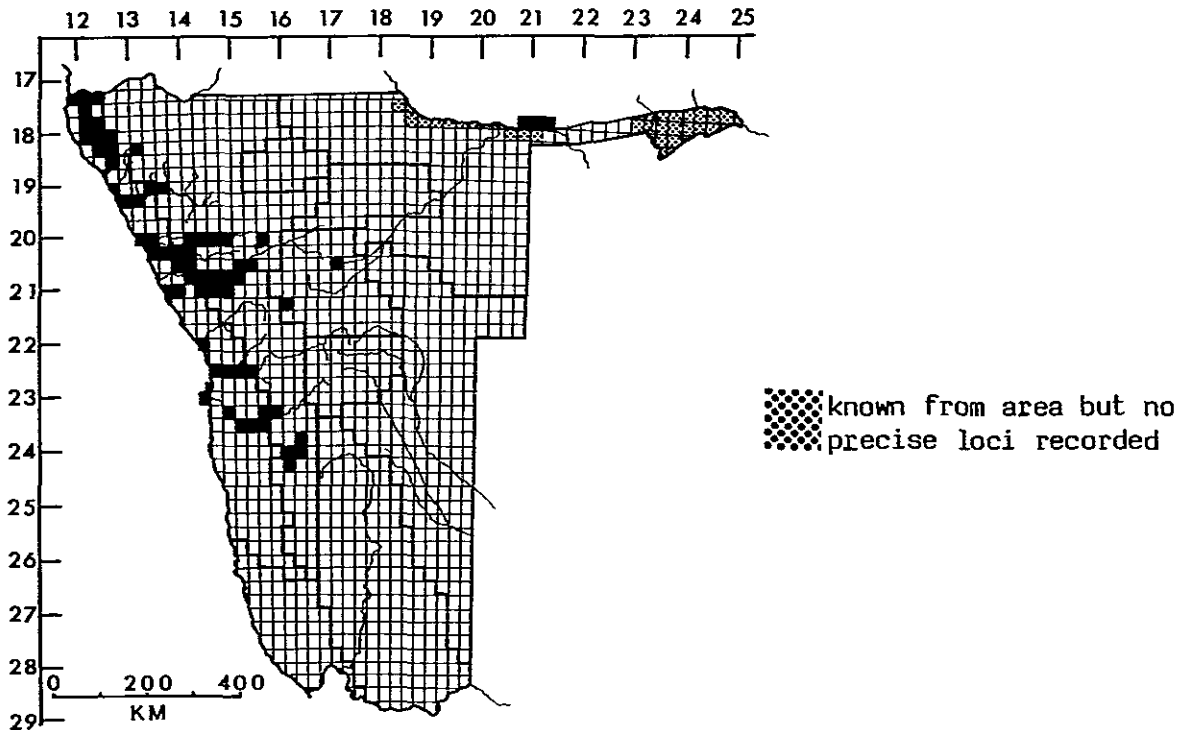
MAP 13. Distribution map of Nicotiana glauca.



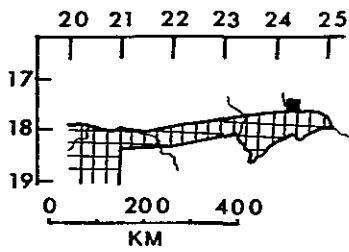
MAP 14. Distribution map of Opuntia ficus-indica.



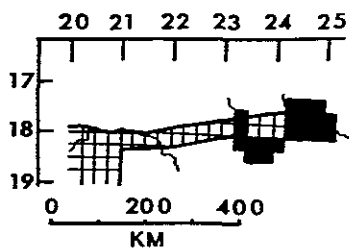
MAP 15. Distribution map of Prosopis spp.



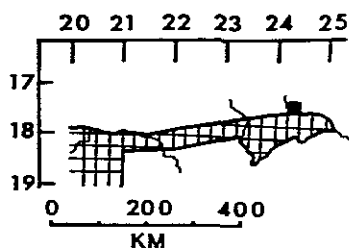
MAP 16. Distribution map of Ricinus communis.



Bambusa balcooa

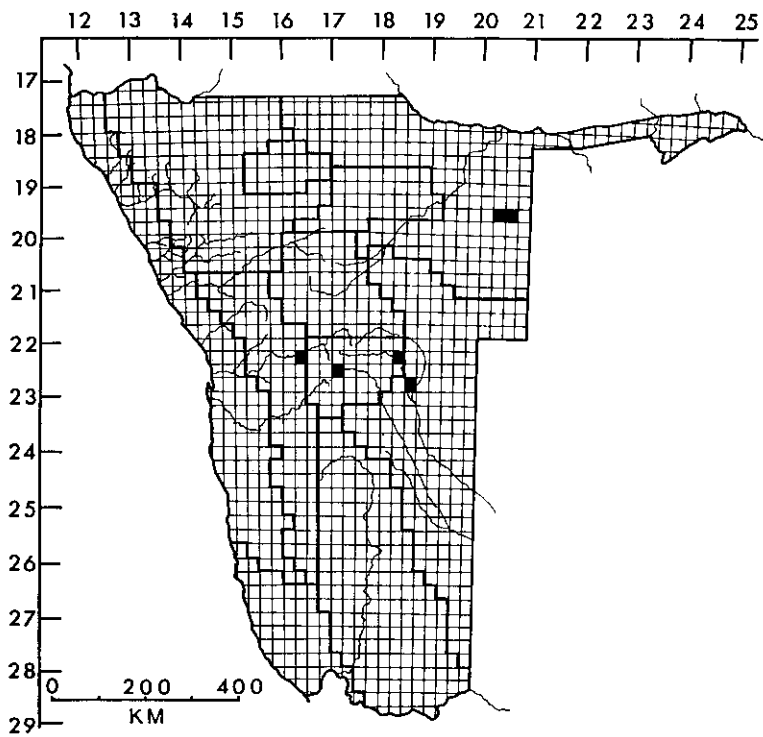


Salvinia molesta

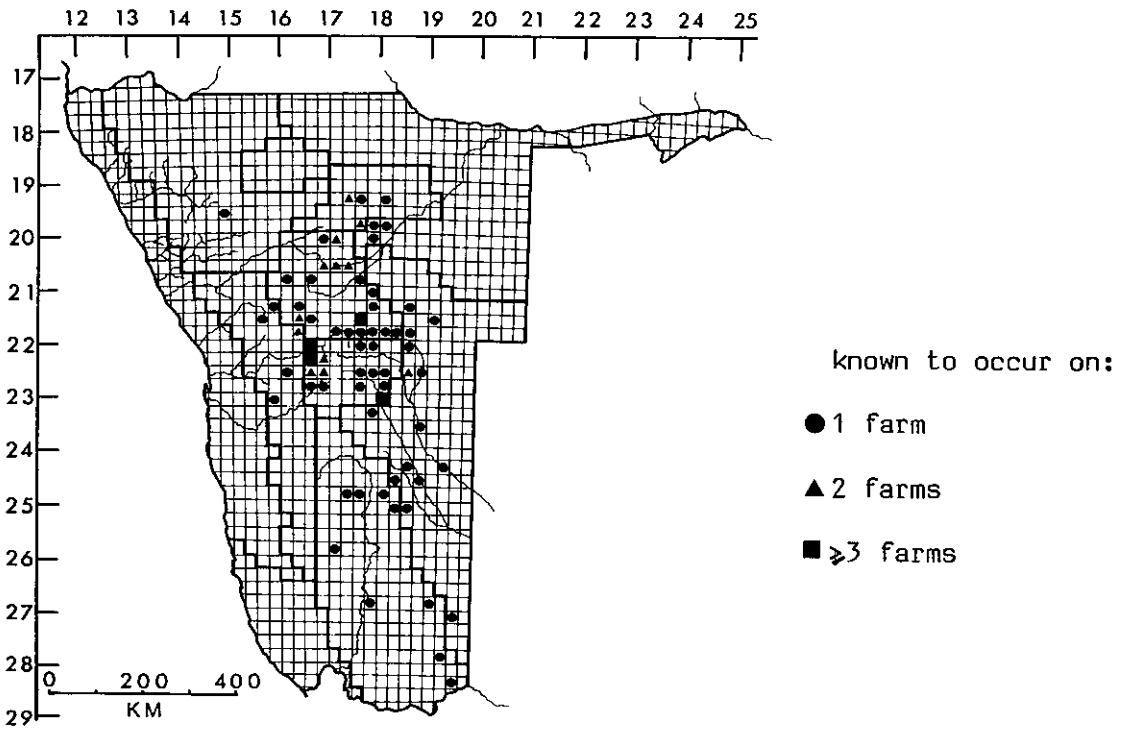


Solanum mauritianum

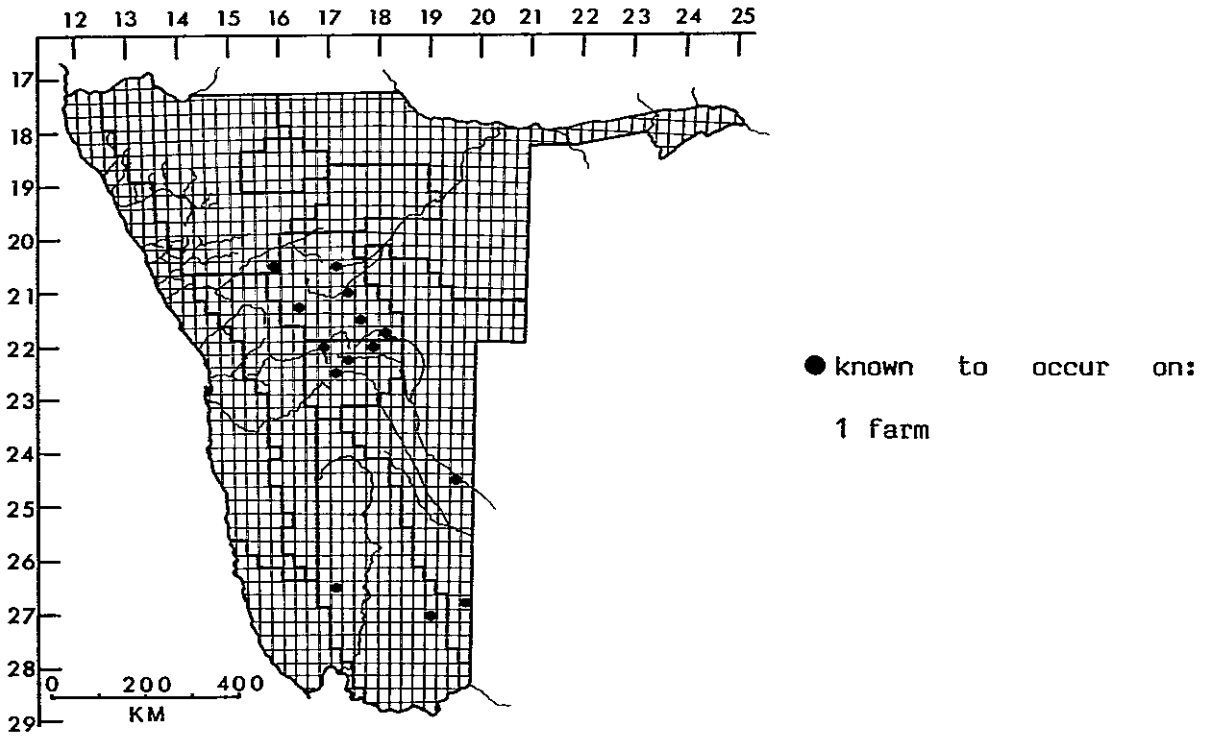
MAP 17. Distributions of three alien plant species known only from the Caprivi Strip.



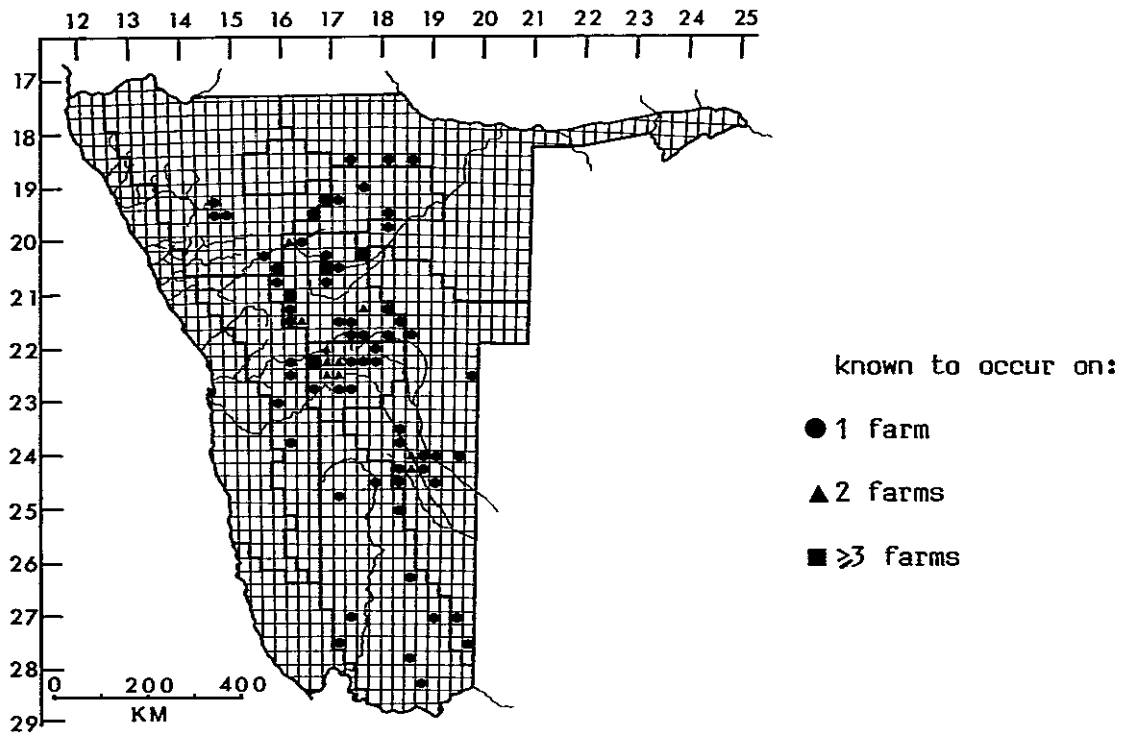
MAP 18. Distribution map of Xanthium spinosum.



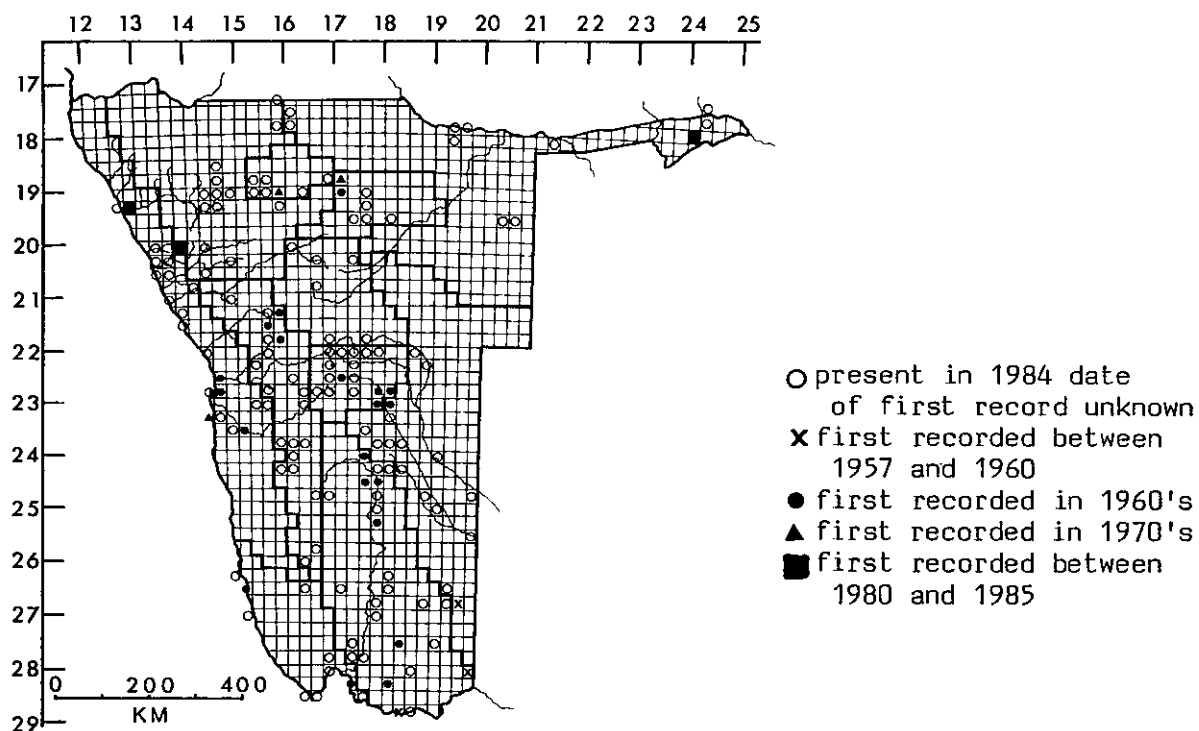
MAP 19. Distribution map of Cyprinus carpio.



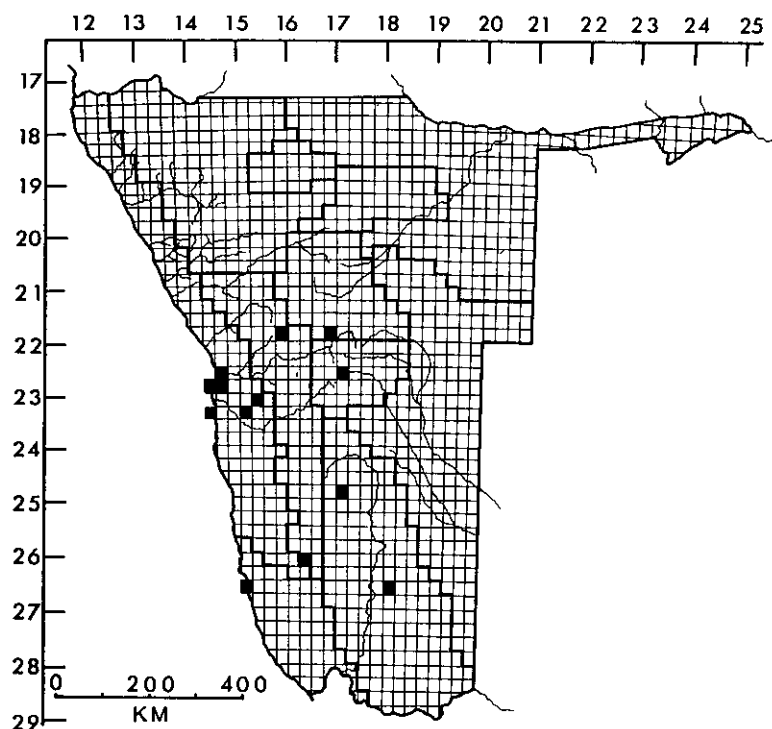
MAP 20. Distribution map of Micropterus salmoides.



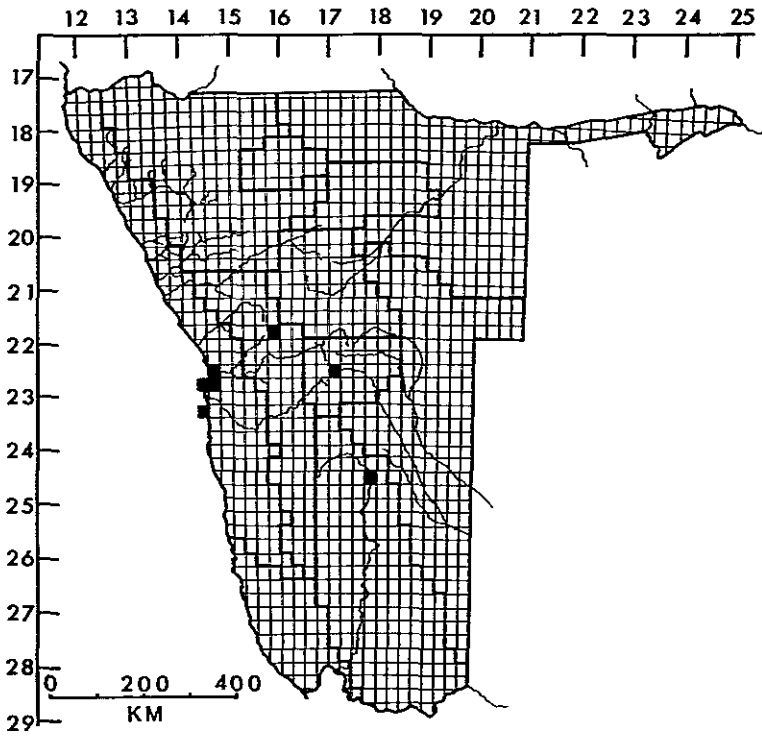
MAP 21. Distribution map of Oreochromis mossambicus.



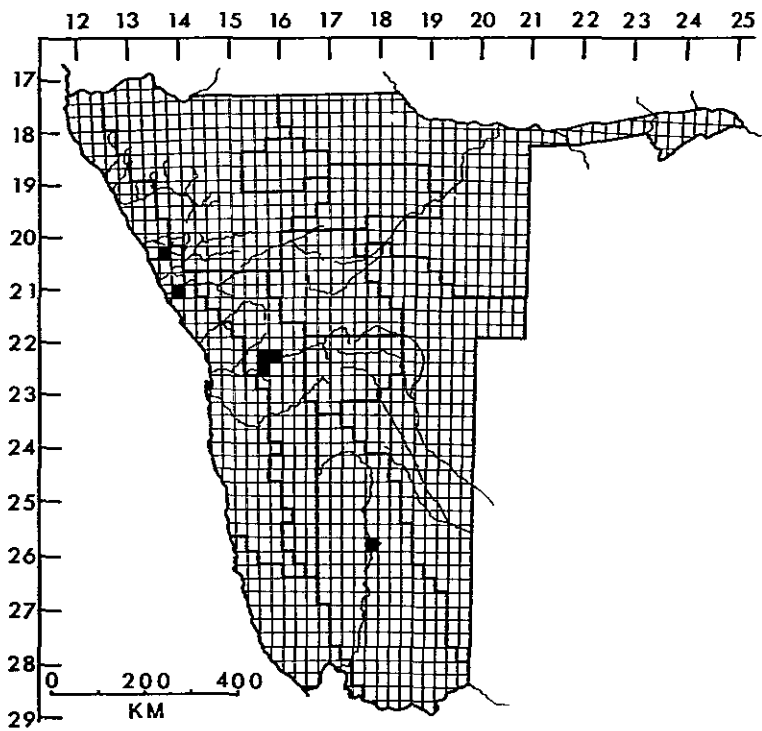
MAP 22. Distribution map of Passer domesticus.



MAP 23. Distribution map of Mus musculus.



MAP 24. Distribution map of Rattus rattus.



MAP 25. Distribution map of known feral population Capra hircus.