NATIONAL PROGRAMME FOR ENVIRONMENTAL SCIENCES
(TERRESTRIAL ECOSYSTEMS SECTION)

NP14/106/9L-5

FYNBOS BIOME PROJECT: FIFTH ANNUAL RESEARCH MEETING

PROGRAMME FOR RESEARCH REVIEW MEETING TO BE HELD IN LECTURE THEATRE 3A,LESLIE SOCIAL SCIENCES BUILDING, UNIVERSITY OF CAPE TOWN, ON TUESDAY 28 JUNE 1983

TUESDAY 28 JUNE 1983 - LECTURE HALL 3A AND FOYER OF LESLIE CONFERENCE CENTRE

08h15-08h45 REGISTRATION AND COFFEE

08h45-09h00 Introduction - Mr F J Kruger,
South African Forestry Research Institute

REVIEW AND POSTER SESSIONS: - Chairman: Mr P Frost

1. 09h00-09h20 History of landuse, soils, geomorphology & palaeoecology - Mr Anton Scholtz (University of Stellenbosch)
09h20-09h50 Posters (1, 2, 3, 4 & 45)

2. 09h50-10h10 Mapping & classification studies - Mrs M L Jarman (CSIR)
10h10-11h00 Posters (5, 6, 7, 8, 9, 10, 11 & 46) and TEA

3. 11h00-11h20 Nutrient cycling and energy budgets - Prof D T Mitchell (University of Cape Town)
11h20-12h00 Posters (12, 13, 14, 15, 16 & 17)

4. 12h00-12h20 Hydrology & hydrobiology - Dr J Day (University of Cape Town) & Mr D Versveld (Jonkershoek Forestry Research Station)
12h20-12h45 Posters (12, 18, 19, 20, 21, & 22)

12h45-13h45 LUNCH

5. 13h45-14h15 Community ecology & fire - Mr G J Breytenbach (Saasveld Forestry Research Station) & Mr B van Wilgen (Jonkershoek Forestry Research station).
14h15-15h00 Posters (23, 24, 25, 26, 14, 27, 28, 29, 30, 31, 32, 43, & 44)

6. 15h00-15h30 Alien studies - Mr I A W Macdonald (University of Cape Town)
15h30-16h00 Posters (23, 33, 34, 35, 36, 37, 38 & 39) and TEA

7. 16h00-16h20 Conservation working groups - Mrs M L Jarman (CSIR)
16h20-16h50 Posters (40, 41 & 42)

8. 16h50-17h10 Fynbos model - Mr J Miller (Jonkershoek Forestry Research Station)

CONCLUDING SESSION

9. 17h10-17h30

SOCIAL FUNCTIONS

10. 17h30-18h30 Cocktail party at same venue

19h30 BARN DANCE

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POSTER ABSTRACTS

HISTORY OF LANDUSE, SOILS, GEOMORPHOLOGY AND PALAEOECOLOGY

1. Adaptive strategies of prehistoric pastoralism in the south west Cape

A B Smith
Archaelogy Department, UCT, Private Bag, RONDEBOSCH, 7700.

ABSTRACT

The subsistence strategies of the majority of pastoralists in the south west Cape was closely tied to seasonal variation in pasture. Several components controlled the availability of forage for their herds:

(a) rainfall
(b) soils

The south west Cape is a winter rainfall zone, thus pasture was available throughout the area during winter. In summer the rains only clip the edge of the continent. This meant that the Peninsula and vicinity retained reasonable pasture, while in the northern areas around St Helana Bay the pasture availability was diminished.

Soil diversity throughout the area varies from that derived from low nutrient sandveld to higher status shales and granites. The vegetation reflects this nutrient availability and would have constrained pastoral land use to a considerable extent. This seasonal rainfall and differential pasture nutrition resulted in a transhumant response from the khoi.

2. The origins and early evolution of some "fynbos taxa".

A Scholtz
Department of Archaelogy, University of Stellenbosch, STELLENBOSCH, 7600.

ABSTRACT

A detailed palynological analysis of the sediments of the Arnot Pipe (situated on the north western interior of the Fynbos Biome area, close to an island of fynbos veg'etation in the Kamiesberge) has revealed that during the early Tertiary ancestoral Proteaceae, Ericaceae, Restionaceae and Thymelaeaceae were growing on eutrophic soils as components of a forest vegetation, under warm, moist, dryish and moderately equable climate. The implications of this evidence for hypotheses about the origins and evolution of the fynbos are discussed.

3. An outline of the vegetation history of the last 50 000 years in the southern Cape: the major features of the record produced by charcoal, faunal and palynological analysis of the sediments of Boomplaas Cave, Cango Valley.

A Scholtz, D L Daitz and H J Deacon
Department of Archaelogy, University of Stellenbosch, STELLENBOSCH, 7600.

ABSTRACT

At least five major phases of climate and states of vegetation can be recognised during this time period. Some of the changes of climate recorded, would have had profound effects on the distribution of vegetation throughout the biome. The evidence from the fossil record can help to explain present day distribution patterns.

4. Environmental changes during the last CA 7 000 years on the coastal forelands of the southern Cape

A Scholtz
Department of Archaelogy, University of Stellenbosch, STELLENBOSCH, 7600.

ABSTRACT

Palynological analysis of 3 valley peats in the George area has produced evidence for environmental changes during the last 7 000 years. Periods of forest expansion and contraction are recorded and grassland was a much more promiment feature on the coastal forelands, prior to the introduction of European agriculture. However, a deterioration of the environment indicated by a contraction in the distribution of forest, is recorded before European settlement. The recent history of vegetation on the coastal forelands of the south western Cape is probably similar to that recorded in the southern Cape.

45. A computer approach to mapping the 'opgaaf': the population of the Cape in 1731.

Presented by M L Jarman
From: L Guelke
University of Waterloo, Ontario
(SA Jnl. of Photogrammetry, Remote Sensing & Cartography 13(4), 1983:227-237 (14 Maps).

ABSTRACT

European colonial settlement at the Cape in the seventeenth and eighteenth centuries was well documented by the Dutch East India Company. From the opgaaf, or annual census of the free population, supplemented by land records in the Deeds Office, Cape Town, the writer has compiled data bases which include geographical coordinates of land holdings, number and ethnic origin of free people, knegts and slaves, from which a variety of maps have been generated. Those for 1731 are reproduced and explained in this paper.

MAPPING AND CLASSIFICATION STUDIES

5. The plant communities at Pella

C Boucher, BRU, Department of Agriculture, P O Box 471, STELLENBOSCH, 7600.

ABSTRACT

The vegetation is sub-divided into nine shrubland communities which represent Euclea racemosa Strandveld, Phylica cephalantha Fynbos and an alien community. These communities are related to environmental features. The floristics are discussed and a preliminary check-list of 404 species is included. The work is supplemented by tables, figures, maps and appendices.

6. Mapped major vegetation categories in the fynbos biome.

E J Moll, R M Cowling and L Bossi (Department of Botany, UCT, Private Bag, Rondebosch, 7700); B M Campbell (Division of Biological Sciences, University of Harare, Zimbabwe); C Boucher (Department of Agriculture, P O Box 471, Stellenbosch, 7600); M L Jarman (CSP, CSIR, C/O Department of Organic Chemistry, UCT, Private Bag, Rondebosch, 7700).

ABSTRACT

The fynbos biome, which closely approximates the geographic area of the Cape Floristic Kingdom (Goldblatt 1978, Kruger 1979a), has received little syntaxonomic treatment, and Acocks' (1953) treatment has had to suffice as an overall vegetation classification of the biome. Over the years it has become clear that Acocks' treatment is inadequate and Acocks himself stated that the subdivision of mountain fynbos into Macchia and False Macchia was like "dividing the tropical vegetation of South Africa into grassveld and bushveld". Apart from the problems of an inadequate classification, a precise and generally acceptable definition of 'fynbos' has so far eluded botanists; and this has led to confusion amongst other environmentalists (see Moll & Jarman 1983).

Since 1978, concomitant with the emergence of the Fynbos Biome Project, there has been an upsurge of research activity in the biome. As part of the initial study phase of the project many workers have undertaken descriptive studies aimed at mapping, classification and characterization of biome vegetation both on an intensive and extensive scale. Up to date regional phytosociological and structural data are now available from Bond (1981) (structure and floristics in the southern Cape mountains), Boucher (in prep) (floristics in the west coast lowlands), Campbell (1984a or b) (structure in the mountains) and Cowling (1983a or b) (floristics in the eastern Cape). In addition the major vegetation types have been mapped at 1:250 000 scale from Landsat imagery (Jarman, Bossi & Moss 1981, Moll & Bossi, Bossi in prep).

As a result of these research activities the time is ripe to present a synthesis of the findings; a scheme of vegetation categories that is a second approximation to Acocks' work. Unfortunately the available regional data are of various types (structure in some cases; floristics in others), and there are large areas of the biome not covered in the regional surveys. Because of these limitations, a limited hierarchy is suggested here and the applicable map scales are those of about 1:250 000 or smaller. Controversies still remain, and even within the present authorship there are some divergent views.

A preliminary version of the scheme is presented here. It consists of a four tier hierarchy, with 18 mapped categories of vegetation at the lowest level. These are categories recognised at a final map scale of 1:1 000 000.

7. Soils of south western and southern Cape

B H A Schloms
Department of Agriculture, Private Bag, Elsenburg, 7607.

ABSTRACT

The soil distribution pattern of the south western and southern Cape shown on the maps is the result of differences in parent material, terrain, past and present climates and age. The major erosion surfaces occurring in the area have a more or less uniform soil distribution pattern and they are represented by the different mapping suits.

8. Metropolitan Cape Town: the natural environment

B Gasson
Department of Urban and Regional Planning, UCT, Private Bag, RONDEBOSCH, 7700.

ABSTRACT

This display of 23 map sheets represents an inventory of all available information on environmental factors pertaining to the Cape Metropolitan area. Sources of information were: various departments at both the University of Cape Town and the University of Stellenbosch; the S A Museum; various institutes of the CSIR; Geological Survey Department; the Botanical Research Unit, Stellenbosch; other divisions of the Department of Agriculture; Water Affairs; Fisheries Development Corporation; Sea Fisheries Research Institute; Weather Bureau and local authorities. It represents the culmination of a compilation job started in 1977.

The map series is of utility to both environmentalists and planners. The emphasis in the proposed follow-up will be placed on conveying the information, and interpretation of the information, to decision takers in urban and regional planning situations. Other interpretations of the information could obviously be made.

9. Mapping of mountain vegetation from Landsat CCT data

T Newby
Department of Environment Affairs, Private Bag X9005,
CAPE TOWN, 8000.

ABSTRACT

Previous research into the use of digital processing of Landsat CCT data in the south west Cape region has concentrated either on detailed analysis of areas of minimum topographical relief, such as the Langebaan area; or on broad regional analysis, where the effects of topography are not so marked.

This study has been initiated in order to text these techniques at a detailed level of investigation in areas of marked topography - i.e. mountain catchment areas - in order to investigate the problem of shadow; and to test the effectiveness of these methods of automated mapping for catchment management purposes.

10. The vegetation of the Cape of Good Hope Nature Reserve

H C Taylor
BRU, Department of Agriculture, P O Box 471, STELLENBOSCH, 7600.

ABSTRACT

In the centre of the poster is the vegetation map of the Reserve drawn after a vegetation survey in 1966-67. Surrounding the map are colour plates illustrating the low, mixed, semi-succulent Coastal Fynbos of the rocky coastline, some of the Inland Fynbos communities with their characteristic restioid, ericoid and proteoid elements, and the Broadleaved Scrub that develops from some Coastal Fynbos communities where fire has been excluded.

Four noteworthy plants are illustrated on the top left side of the poster, and in the bottom right-hand corner are maps and photographs showing the distribution and spread of two woody plant invaders that pose a serious thre to the native flora.

11. Vegetation communities of Zachariashoek

B van Wilgen
Jonkershoek Forestry Research Station, Private Bag X5011,
STELLENBOSCH 7600

ABSTRACT

105 Braun-Blanquet plots have been used to describe 10 communities in Mountain Fynbos at Zachariashoek (Lamotte State Forest near Paarl). The poster illustrates the communities by means of a B-B Table, photos and suggested community names.

46. Maps of other mediterranean regions

Contributed by H C Taylor
Botanical Research Unit, P O Box 471, STELLENBOSCH, 7600.

NUTRIENT CYCLING & ENERGY BUDGETS

12. The limnology of standing waters in fynbos areas of the south western Cape

A Gardiner and J Day
Department of Zoology, UCT, Private Bag, RONDEBOSCH, 7700.

ABSTRACT

Lentic waters of the fynbos are characteristically black, acid and low in nutrient. The dark colour derives from the decay products of the fynbos which incorporate high levels of plant secondary compounds. This project aims to investigate the relationship between these humic substances, the aquatic fauna and flora and the water chemistry and thus gain an understanding of the effect of the fynbos and its decay cycle on the functioning of the system.

Six south-western Cape vleis varying in intensity of water colour, pH and nutrient levels have been studied over a fifteen month period. The water bodies have been sampled monthly at seventeen fixed points for fauna, flora, water and sediment. Physicochemical measurements include temperature, water depth, pH, conductivity and analysis for NO_3, NO_2, NH_3, PO_4, Na, K Ca, Mg, Fe and Cu and humic substances (including humic and fulvic acids and polyphenolic compounds). Measurements of flora include chlorophll levels and phytoplankton species diversity and faunal measurements include species diversity and numbers.

13. Variations in reflectivity - Fynbos and Karoo

P A Johnston and R F Fuggle
School of Environmental Studies, UCT, Private Bag, RONDEBOSCH, 7700

ABSTRACT

Reflectivity is a measure of the ratio of incoming solar radiation to that which is reflected. Different veld types have varying reflectivity ratios depending on their vegetation structure and composition. Nine sites (veld types) were selected and comparisons were made between the reflectivity of natural vegetation and that of disrupted vegetation - from man induced changes. It was found that the latter readings were significantly higher and that a greater variation was to be found amongst disturbed vegetation than amongst natural veld types.

14. ATP determination as an indicator of active microbial biomass

M A Loos, U L van Coller, G J Waso
Department of Microbiology and Virology, University of Stellenbosch, STELLENBOSCH, 7600.

ABSTRACT

Measurement of ATP by luminometry involving the firefly luciferin-luciferase reaction can be used as an indicator of active microbial biomass in soils. Various methods differing particularly in soil extraction procedures are being evaluated, initially using cultures of bacteria and fungi. The trichloroacetate-phosphate- paraquat extraction technique of Jenkinson and Oades appeared unsuitable for use with the Lumac Biometer as a result of pronounced quenching; it also uses much expensive ATP. The Lumac NRB extraction procedures yielded ATP values for bacteria (Escherichia coli, Bacillus subtilis) in close or approximate agreement with published values, but low ATP values for a yeast (Saccharomyces sp.). ATP degraded rapidly in cold homogenised Tris-EDTA extracts of Penicillium expansum, but not following extraction at high temperature; Tris-EDTA extraction at ca. 80C with ball-milling of the microbial cells is therefore being evaluated. The highest values for extracted ATP agree with literature values, but others are less satisfactory.

15. The acquisition and utilization of nitrogen by two fynbos species

W D Stock and O A M Lewis
Department of Botany, UCT, Private Bag, RONDEBOSCH, 7700

ABSTRACT

This paper reports on an investigation of the uptake assimilation and re-distribution of nitrogen in two fynbos plants, Protea repens (Proteaceae) and Thamnochortus punctatus (Restionaceae).

The low nutrient soils of the south western Cape require plants to evolve strategies of mineral nutrition which optimize production from available nutrient sources and increase plant 'fitness'. Plants may evolve strategies which can fall into one or more of the following categories:

a) Evolution of mechanisms to optimize mineral acquisition such as increased root length and area, mycorrhizal association and N_2 fixing ability.
b) A decreased demand for mineral nutrients in conjunction with low physiological activity.
c) Evolution of efficient mineral conservation mechanism within the plant such as the production of evergreen leaves and internal re-distribution of scarce elements.

Protea repens appears to have evolved a strategy of a limited demand for N (both NO_3^- and NH_4^+) in conjunction with a slow growth rate.

Thamnochortus punctatus reveals an economical utilization of N by asynchronous organ growth with possible re-utilization of existing N to allow this development to proceed.

16. Variations in soil phosphorus in the strandveld vegetation at Melkboschstrand

E Witkowski & D T Mitchell
Department of Botany, UCT, Private Bag, RONDEBOSCH, 7700.

ABSTRACT

Although phosphorus cycling processes have been intensively studied in the coastal fynbos at Pella, it was felt necessary to investigate variations in soil phosphorus in other ecosystems of the fynbos biome. This poster deals with soil phosphorus in an area of strandveld vegetation at Melkboschstrand on the Atlantic coast of the south western Cape. During May/June 1983, soil cores (0-10 cm depth) were taken along a 750 m transect, starting at approximately high water mark and extending inland through strandveld vegetation to a stand of Acacia cyclops (Rooikrans). In addition, cores were taken from the rhizosphere of dominant plant species. The soils were analyzed for organic matter content, pH, total phosphorus, plant available phosphorus (using two methods), organic phosphorus (using three methods) and inorganic phosphorus. These preliminary results will be compared with those of coastal fynbos at Pella.

17. Litter decomposition of leaves from Leucospermum parile and Protea repens

S Webb, F Coley and D T Mitchell
Department of Botany, UCT, Private Bag, RONDEBOSCH, 7700

ABSTRACT

Litter bag methods have been used to study decomposition of leaves from Leucospermum parile and Protea repens at Pella and Protea repens from Swartboschkloof, Jonkershoek. Annual rates of decomposition (i.e. loss in dry mass) of leaf litter of L.parile and P. repens at Pella and Jonkershoek during the first year were approximately 11, 26 and 18% respectively. The loss of five organic components (fats and waxes, soluble carbohydrates, soluble phenolics, holocellulose and lignin) and phosphorus from litter of L. parile will be presented. The lignin composition (approximately 40% of the original litter) does not decline until after one year on the soil surface.

The phosphorus component of the litter is also very resistant to decomposition. The results presented in this study are similar to those carried out in the Californian chaparral and Australian heaths, although the annual overall decomposition rates of fynbos leaf litter are generally slower.

HYDROLOGY AND HYDROBIOLOGY

12. The limnology of standing waters in fynbos areas of the south western Cape.

A Gardiner and J Day
Department of Zoology, UCT, Private Bag, RONDEBOSCH, 7700.

ABSTRACT: See under 12 (Nutrient Cycling & Energy Budgets)

18. Proposed Eerste-Rivier catchment study

B R Davies, J M King and J A Day
Department of Zoology, UCT, Private Bag, RONDEBOSCH, 7700.

ABSTRACT

Objectives of the planned study which are illustrated by the poster are:

(a) Management

To look at a complete river and its catchment and to determine how different vegetation types, including alien invasives, and different land uses and management within the catchment affect functioning of the river. The river, which is now grossly disturbed originally supported a wide variety of fynbos types, which have survived to varying degrees.

(b) Concepts

To examine the concepts developed from work on northern hemisphere streams, and to determine their applicability in a wider context. In particular, to focus on the inputs of kinetic and organic energy into a river system, and to relate these inputs to the hypotheses of Vannote et al, 1980, (the river continuum concept) and Webster, 1975, the nutrient spiralling concept).

(c) Nutrient Budget

To develop a nutrient budget for a small, fynbos-dominated sub-catchment within the larger study area.

19. Soil/water/plant model

J L Hudson
Department of Agriculture, Private Bag, Elsenburg, 7607

ABSTRACT

A computer simulation model of the infiltration, redistribution, drainage and evapotranspiration of soil/water is presented. Flow of water between horizontal soil layers is calculated by means of a finite/difference solution of the general equation of water flow in soil. Soil profile characteristics are reflected in profile hydrological properties. Water lost by transpiration is determined by root distribution, soil/water content and potential transpiration. Evaporation depends upon potential evaporation and is limited by the rate at which water can move towards the surface.

Cumulative infiltration, drainage and evapotranspiration together with profile water content, potential and flux density distribution, are printed at any described simulated interval.

20. Rainfall interception in Protea neriifolia

D Versfeld
Jonkershoek Forestry Research Station, Private Bag X5011, STELLENBOSCH, 7600.

ABSTRACT

Rainfall, throughfall, and stemflow are measured on a continuous, real-time basis in a closed canopy Protea neriifolia stand at Swartboschkloof.

An above-canopy automatic weather station simultaneously monitors ambient conditions (temperature, humidity, wind, net and solar radiation). Data will be used in the development of a predictive model for rainfall interception of the Rutter/Gash type.

21. Seasonal course of plant water potential at the arid fynbos-karoo boundary

J Miller
Jonkershoek Forestry Research Station, Private Bag X5011, STELLENBOSCH, 7600.

22. Evidence of mist trapping?

E J Moll & N Romoff
Department of Botany, University of Cape Town, RONDEBOSCH, 7700.

ABSTRACT

Pre-dawn and mid-day xylem pressure potentials of different aged Thanochortus punctatus plants at Pella on 2 June 1983, a day that had a misty start, gave unexpected results. We suggest that mist capture by the funnel shaped, shallow rooted tussocks facilitated this, as the deep rooted shrub, Leucospermum parile, showed the expected decrease in xylem pressure potentials at mid-day for plants of similar age.

COMMUNITY ECOLOGY AND FIRE

23. Pollination and pollinators in healthy and invaded fynbos systems.

W Breytenbach and G J Breytenbach
Saasveld Forestry Research Station, Private Bag 6531, GEORGE, 6530.

ABSTRACT

We are investigating the effect of invasive plants on pollination and the structure of pollinator communities. It is our intention to show that at a certain density invasive plants start interfering with the spatial distribution of indigenous species to such an extent that pollinators do not carry out their normal functions. Pollinators are collected and dusted to determine the species spectra of plants visited. Seed set for selected species are determined and the difference in seed set between invaded and normal sites compared.

24. Observations on pollination and its possible evolutionary influence on the flower structure and colour of some petaloid monocotolydens in fynbos

J Vlok
Saasveld Forestry Research Station, Private Bag 6531, GEORGE, 6530.

ABSTRACT

Two hypotheses on pollinator influence on flower structure and colour are presented.

The first could explain the high occurrence of spectacular red flowers in flowers during the summer and autumn months, while the second shows the influence of pollinator selection on the evolution of Iridaceae flower structure.

25. Plant-bird dispersal systems in fynbos

Richard Knight
PFIAO, UCT, Private Bag, RONDEBOSCH, 7700.

ABSTRACT

A proposed method of study on the role birds play in the dispersal of plant species occurring within two communities of the fynbos biome. The two communities are a forest/thicket occurring in kloofs and a coastal littoral thicket, both of which are characterized by an abundance of plant species possessing fleshy diaspores. The first objective is to determine the influence that birds play in the successional processes. The second objective is to estimate for selected plant species, the total amount of energy invested in a fruiting display in terms of its potential to attract avian frugivores. The third objective is to describe the general relationships existing between plants and their avian frugivores. Data on fruit seasonality, the energy content of fruits, the size of fruit crops and the importance of fruit in the diet of birds will be collected. Successional processes will be monitored within quadrants and under five experimental conditions.

26. Fire season and fynbos response

D C le Maitre
Jonkershoek Forestry Research Station, Private Bag X5011,
STELLENBOSCH, 7600.

ABSTRACT

The present working hypothesis is that season of burn will not determine the presence or absence of species, but will determine the relative abundance of species and therefore also the dynamics of that community. Analyses of data from the Kogelberg study suggest that this is true and emphasize the role of stand structure and weather conditions. They also emphasize the variability in responses and the need for a more detailed understanding of fynbos regeneration.

14. ATP determination as an indicator of active microbial biomass

M A Loos, U L van Coller, G J Waso
Department of Microbiology and Virology, University of Stellenbosch,
Stellenbosch, 7600.

ABSTRACT

See under No 14 (Nutrient Cycling and Energy Budgets)

27. Some thoughts on the dynamics of Widdringtonia cedarbergensis with regard to season of burn.

P T Manders & S A Botha
Jonkershoek Forestry Research Station, Private Bag X5011,
STELLENBOSCH, 7600.

ABSTRACT

Certain factors determine the degree of successful seedling establishment in Widdringtonia cedarbergensis. These are as follows:

a) the number of seed released,
b) post-dispersal predation,
c) the presence of germination sites,
d) the presence of conditions suitable for germination,
e) seedling mortality due to frost and snow,
f) seedling mortality due to summer drought.
g) seedling mortality due to predation.

It is proposed that, with the exception of the availability of germination sites, all these factors can be influenced by the season in which cedar areas are burnt.

A sowing trial is currently being undertaken in the field to determine the effects of site and the season of sowing on the success of germination and subsequent establishment. Series of exclosures are being used to determine the presence of post-dispersal seed predation and seedling predation at the various sites.

The results will also be interpreted from the viewpoint of establishing an effective method of augmenting populations in areas where the species has been reduced to critical levels or has recently been eradicated.

28. Die kiemingsfisiologie en morfologie van verteenwoordigers van c Ericaceae, Restionaceae en Iridaceae

J C Small, P J Robertse en A D Esterhuizen
Margaretha Mes Instituut vir Saadnavorsing, Departement Plantkunde,
Universiteit van Pretoria, PRETORIA, 0001

SAMEVATTING

Die hoof doelstelling van hierdie projek is om die kiemingsgedrag van verteenwoordigers van die Ericaceae, Restionaceae en Iridaceae to bestudeer en hieruit die natuurlike kiemingsstrategieë te probeer verstaan. Die studie sal behels dat bepaal word of saad in 'n rustoestand verkeer, hoe die rustoestand opgehef kan word, hoe kieming deur omgewingsfaktore (lig, temperatuur, pH, soutgehalte ens.) beïnvloed word, wat die langlewendheid van die saad is en hoe dit deur ópbergingstoestand beïnvloed word. Saad van dié spesies is reeds versamel: Watsonia fourcadei, Erica sparsa, E.sessiliflora en E.hebecalyx.

Opbergings- en kiemingsstudies is met bogenoemde spesies begin. Resultate uit beginproewe met vars saad van Watsonia fourcadei en 4 jaar oue saad van Erica sparsa toon dat lae temperature (10-15°C) kieming begunstig. Die nadelige invloed van hoër temperature kan in 'n mate deur Gibberelliensuur opgehef word. Hoë temperature induseer 'n mate van positief fotoblastisme by saad van Watsonia fourcadei.

29. Sunbird-Erica pollination systems in Mountain Fynbos

A S Rebelo
PFIAO, UCT, Private Bag, RONDEBOSCH, 7700.

ABSTRACT

The Erica-Orange-breasted Sunbird pollination system embraces over 100 species of Erica. While virtually nothing is known about pollination systems in fynbos, one can predict that as large a pollinator plant species ratio as this requires a very generalist pollinator. This puts the pressure of ensuring adequate pollen flow between plants of the same species squarely on the plant species involved. Additionally, Erica species compete with a variety of other ornithophilous plants vying for the utilization of the few pollinator species available. Separate pollen flow, on such an opportunistic pollinator, is segregated by separate flowering seasons, dense populations in monospecific stands and possibly also by segregating nectar secretion periods. Since the tube-shaped flower does not allow segregation of pollen loads on the birds, an efficient imcompatibility backup system is needed to explain why hybridization is not more frequent. This backup system may precipitate speciation and contribute, together with the small seed size, to the high species richness of the genus.

30. Mole rat - geophyte interactions

J Jarvis, K Davies & B Lovegrove
Zoology Department, UCT, Private Bag, RONDEBOSCH, 7700.

ABSTRACT

Preliminary analysis of data collected in November 1982, on the farm "Waylands" at Darling, indicate that the mole rats Cryptomys hottentotus and Georychus capensis regularly store geophytes. Bathyergus suillus does not.

A comparison of the geophytes available to the mole rats with those stored shows that C. hottentotus preferentially stores certain goephyte species. Not enough data are available for G. capensis. Furthermore, the mean diameter of most of the species stored was significantly larger than that in the surrounding soil - suggesting that mole rats selectively store the largest sized geophytes of any species. The significance of both these findings in terms of the importance of mole rat - geophyte interactions in fynbos is not known. Other types of fynbos will have to be studied before this can be determined. We do, however, have evidence that geophytes in abandoned food stores can sprout and reach the surface and here the effects of competition for space and nutrients need further study.

A tremendous amount of hard labour is needed to collect meaningful data on mole rats and geophytes (we dug up nearly 2 kilometers of burrow system and sifted about 3,5 tonnes of soil to collect our information at Darling). We are at present analysing our results to determine the minimum number of samples needed to obtain in an area. We are also working on ways of marking geophytes and then relocating them in stores - perhaps with a metal detector. If successful, we plan to look at mole rat-geophyte interactions in mountain fynbos and renosterveld and thereby obtain a broader picture of what is happening.

31. Faktore wat die verspreiding van akkedisse in die fynbosbioom bepaal

P N le F Mouton en Dr B Oelofson
Departement Soölogie, Universiteit van Stellenbosch, STELLENBOSCH, 7600.

SAMEVATTING

'n Trajek van ongeveer 10 km wyd, wat strek vanaf Kabeljoubank aan die wes[illegible] tot bo-op die Elandskloofberge in die ooste is uitgekies as toets area. Die kajek word maandeliks besoek om die verspreidingspatrone van die betrokke akkedisspesies langs die trajek te bepaal. Ook word alle moontlike inligting aangaande hul biotiese en abiotiese omgewing, aktiwiteitspatrone en termoregulering ingesamel. In die laboratorium word die fisiologiese kapasiteite soos voorkeer liggaams temperature, tempo van hitteverlies, akklimatisasievermoë en osmoreguleringsvermoë van al die betrokke spesies eksperimenteel bepaal. Al hierdie inligting sal gebruik word om te bepaal waarom akkedisse in sekere areas langs die trajek voorkom en in ander nie. Daar word beplan om hieropvolgens 'n studie van groter dele van die suidweskaap te maak. Tot dusver is 9 spesies langs die trajek gevind en 8 van hulle vertoon gebroke verspreidingspatrone. Dus is daar definitief faktore betrokke wat die verspreiding van akkedisse bepaal.

32. Myrmecochory in the Cape fynbos

P Slingsby[1] and W Bond[2]
[1] P O Box 108, Kleinmond
[2] Sawtelle No 3326, Boulevard No 7, Los Angeles, CA 90066, USA

ABSTRACT

Thirty families, including such important families as the Restionaceae, Proteaceae and Rutaceae, employ myrmecochory as a mechanism of seed dispersal and, more importantly, seed storage. Attraction is effected by the production of Methyl formiate, a volatile hydrocarbon similar to the ant's alarm pheromone, by a fatty body equivalent to an elaisome. The high concentrations of formic acid in ants nests may inhibit germination of the stored seeds, thus functioning as an alternative to serotony, with added ant protection. The Argentinian ant, Iridomyrmex humilis, eradicates indigenous ants, and fails to supply seed protection. Acacia longifolia has arils attractive to indigenous ants. The ant-seed storage is thus very vulnerable to alien invasions.

43. The ecological biogeography of the Proteaceae

A G Rebelo[1] & J P Rourke[2]
[1] PFIAO, UCT, Private Bag, RONDEBOSCH, 7700.
[2] Kirstenbosch, National Botanic Garden, Private Bag 7, CLAREMONT, 7735.

ABSTRACT

The aim of this study is to relate the distribution of the Proteaceae in the Fynbos to the ecological parameters which may have a bearing on their current distribution. Ecological parameters considered important include aspects of seed dispersal, fire survival mechanisms, pollination syndromes, habitat specificity, extrafloral nectaries, and plant habit and form. Species distributions will be plotted on a 7,5 x 7,5 minute grid, and investigations into the trends and the extent of ecological parameters, both within the family and in relation to environmental parameters on each grid.

44. Rodents at Pella

D Pepler
Department of Nature Conservation, Stellenbosch University,
STELLENBOSCH, 7600.

ABSTRACT

This poster illustrates data collected so far on populations and species of rodents at the Pella Research site - subsequent to the fire in October 1980.

ALIEN STUDIES

23. Pollination and pollinators in healthy and invaded fynbos systems

W Breytenbach & G J Breytenbach
Saasveld Forestry Research Station, Private Bag 6531, GEORGE, 6530.

ABSTRACT

See No 22 (Community Ecology and Fire)

33. An overview of the alien plant problem

I Macdonald
PFIAO, UCT, Private Bag, RONDEBOSCH, 7700.

ABSTRACT

This poster serves to illustrate an overview project that is being carried out to synthesize the available information an alien plant invaders as they relate to nature conservation in South Africa.

The three levels of data that are to be used in this synthesis are shown, namely literature, a questionnaire survey of all protected areas and field surveys of a much smaller subsample of the protected areas. The proposed format of the questionnaire will be discussed with interested participants.

34. Some interference effects between Protea repens and Acacia saligna

F Pressinger
Department of Agriculture, C/O Department of Botany, UCT, Private Bag, RONDEBOSCH, 7700.

ABSTRACT

Protea repens seedlings were grown at different densities and in the presence of Acacia saligna. It was found that in pure P.repens pots increased density increased the mortality rate and decreased the growth rate of the seedlings. The presence of A. saligna increased the mortality rate and decreased the growth rate.

The initial size of the seedlings played an important rôle in determining their fate: those seedlings that were initially the smallest tended to die, and those seedlings that were initially the largest tended to become increasingly larger and more massive. Similar trends have been measured in the field.

35. Pittosporum undulatum - The time to act is now!

D M Richardson
Jonkershoek Forestry Research Station, Private Bag X5011,
STELLENBOSCH, 7600

ABSTRACT

Pittosporum undulatum has become a notorius invader of forests in the northern tropics, subtropics and warm temperate areas of the northern hemisphere. In its native Australia, concern has been expressed at its spread beyond its "natural" limits.

The invasion of riverine scrub and bush within the Fynbos Biome by this species is noted with concern.

In the Jonkershoek Valley, clumps of P.undulatum seedlings may be observed beneath trees bearing fleshy diaspores attractive to birds (Especially Olea europaea ssp. africana, Maytenus oleoides, Kiggelaria africana). A striking positive association was found to exist between the occurrence of the parasitic Viscum rotundifolium (host: Maytenus oleoides) and the occurrence of P.undulatum seedlings.

The seedlings appear to be shade-tolerant and capable of out-competing the indigenes in the early stages of establishment.

Immediate action to eradicate this species in areas adjoining reserves of undisturbed forest or scrub patches is advocated.

36. Control of alien invader plants in mountain catchments of the western Cape forestry region.
R Andrag
Department of Environment Afairs, Private Bag X9005, CAPE TOWN, 8000.

37. Alien invasions at Pella (S Brownlie)
I Macdonald
PFIAO, UCT, Private Bag, RONDEBOSCH, 7700.

ABSTRACT

The data presented by Sue Brownlie on alien plant invaders in and around the Fynbos Research Site at Pella from her analysis of aerial photographs are presented diagramatically. The importance of disturbance in promoting alien invasions is emphasized. The relative invasion rates for Pinus pinaster and for the Australian Acacia spp. at this site are shown.

38. Acacia seed dynamics (David, Milton & Hall)
I Macdonald
PFIAO, UCT, Private Bag, RONDEBOSCH, 7700.

ABSTRACT

Using data collected by Jeremy David the Acacia seed input and loss rates from the litter layer are presented. The consumption of Acacia seed by Rhabdomys pumilis is more than has been stated by Milton & Hall but probably less than was predicted by David. However, even taking this loss to Rhabdomys into account there is still a substantial loss that remains unaccounted for. The data on seed production, seed fall and annual accumulation into the soil seed bank produced by Milton & Hall is re-evaluated in the light of David's data. The question is posed whether future research on seed dynamics in this group is warranted as seed reserves are obviously far in excess of the amount required for stand maintenance.

39. Is man the worst invasive alien in the fynbos?

I Macdonald
PFIAO, UCT, Private Bag, RONDEBOSCH, 7700.

ABSTRACT

Population estimates and projections for Homo sapiens in the Cape Peninsula/ Cape Flats area are presented for the period 1904 to 2010 AD. Man's relationship to the fynbos is discussed. The possibility of initiating a bio-control programme is suggested.

CONSERVATION WORKING GROUPS

40. Lowland conservation priorities

M L Jarman (in collaboration with 44 members of 5 lowland conservation working groups).
CSP, CSIR, C/O Department of Organic Chemistry, UCT, Private Bag, RONDEBOSCH, 7700.

ABSTRACT

This poster illustrates the activity of five regional lowland fynbos working groups, convened within the Fynbos Biome Project of the CSIR, NPES, in collaboration with the Committee for Nature Conservation Research.

The objectives of these working groups are to:

(i) identify and map all areas in the five regions that deserve designation as protected areas of some type;

(ii) List other details relevant to the protection of each area;

and (iii) Arrange selected areas within each region into a rough priority order, based on the plant community rarity, diversity of habitat, plant species richness, endangered status of component plant species and disturbance by other activities such as livestock grazing, quarrying, bush cutting etc.

A procedure has evolved and a formula developed for rating sites, through successive meetings of informed local botanists and conservationists. This necessitated assessing the conservation status of each major vegetation category throughout the fynbos biome, aided by the results of recent Landsat mapping projects.

41. Preliminary study of the Drift Sands Area of the Cape Corp.

N Wilson
10 Rondebosch Lodge, Main Road, RONDEBOSCH, 7700.

ABSTRACT

The Drift Sands area of the Cape Corp represents one of the few remaining areas of the lowland fynbos and strandveld worthy of conservation attention. This poster illustrates a survey of the flora and fauna of the area.

42. Human and cost factors: grass root problems in nature conservation

C McDowell
Department of Botany, UCT, Private Bag, RONDEBOSCH, 7700.

ABSTRACT

This poster illustates aspects of a socio-economic survey being undertaken into attitudes and constraints and possible strategies to be adopted for effective conservation of remnant patches of west coast renosterveld.