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NEWS-LETTER OF THE SOUTH AFRICAN ASSOCIATION OF BOTANISTS
NUUSBRIEF VAN DIE SUID-AFRIKAANSE GENOOTSAP VAN PLANTKUNDIGES

JAARVERSLAG VAN PRESIDENT:

Dit is vir my aangenaam om verslag te doen oor die werksaamhede van die Raad gedurende 1979. Daar is vier volle raadsvergaderings die afgelope jaar gehou, nl. in Stellenbosch, Bloemfontein, Pretoria en Pietermaritzburg, 'n baie goeie gebiedsverspreiding nl. een in elke provinsie, terwyl verskeie vergaderings van die Uitvoerende Komitee van die Raad gehou is.

Van die vyftien raadslede, het almal die eerste, dertien die tweede, nege die derde en veertien die vierde raadsvergadering bygewoon. Die wysiging van die grondwet sodat 'n raadslik geskors kan word indien hy by meer as een geleentheid gedurende sy dienstermyn nie 'n plaasvervanger aanwys nie, het daartoe gelei dat daar ten minste 'n hele aantal lede by die vergaderings teenwoordig was. Agt, nul en een plaasvervangers het die tweede, derde en vierde vergaderings bygewoon, sodat die gemiddelde bywoning van Raadsvergaderings van 11 in 1978 tot 13 in 1979 gestyg het.

Gedurende die afgelope jaar het 55 persone by die Genootskap aangesluit, terwyl ons 7 lede verloor het. Daar was dus 'n netto toename van 48 lede. Die huidige lidmaatskap staan tans op 403 wat saamgestel is uit 6 erelede, 330 gewone lede, 13 gegradueerde lede, 21 geaffilieerde lede, 10 lewenslede en 14 studenteledede. Een inrigtingslid het bygekom, sodat die totaal van inrigtingslede nou op 11 te staan kom. Mnr J.P.H. Acocks, 'n gewaardeerde lid van die Genootskap is gedurende verlede jaar oorlede, asook Prof. R.H. Compton en Mej. Florence Hewitt. U word versoek om vir 'n paar oomblikke op te staan as 'n blyk van erkenning van hulle dienste en deelname met hulle afsterwe.

Ons het gedurende die afgelope jaar twee van ons lede met eretoekennings vereer. Dr L.E. Codd het die Suid-Afrikaanse Medalje vir Plantkunde ontvang, terwyl Mnr H.J.W. Giess die eerste ontvanger van die SAGP se Sertifikaat vir Verdienstelikheid is. Dr P.D.F. Kok ontvang die SAGP Junior Medalje vir Plantkunde tydens hierdie kongres. Ons hartlike gelukwense aan hierdie persone.

AETFAT

Lede van die SAGP wat aan die NIP verbonde is, is verantwoordelik vir die organisering van die AETFAT Kongres in 1982, met Dr Bernard de Winter as voorsitter van die Reëlingskomitee. Die volgende tentatiewe reëlings is getref:

1. Simposium oor die Afrikaanse flora in Gondwana verband;
2. Twee ekskursies (Noord-Transvaal en Weskaapland)
3. Vierdaagse kongres.

Dit word beplan dat die SAGP-Kongres in 1982 met die AETFAT kongres in Pretoria sal saamval.

Status of botany in South Africa

From various quarters people have expressed their concern about the status or standing of Botany in South Africa and requests that the Council of SAAB should try to do something about this have been put forward. In order to determine the extent of this problem, to answer some questions and to get some figures a questionnaire has been compiled by the Executive Council and this has been amended after circulating it to all Council Members.

The idea was that this first questionnaire should be directed to University Botany Departments and that we would request Heads of Botany Departments to fill it in as completely as possible.

From an analysis of the data received from Botany Departments which covers 1966 - 1978 it seems as if a sustained growth in Botany student numbers, staff numbers, financial support for library, general running costs and research took place.

Only ten questionnaires have been returned at this stage and as soon as all Departments have reacted, the President will prepare a memorandum on the analyzed data, which will be circulated to Council members. After amendments by Council, the memorandum could be submitted for publication in the S.A. Journal of Science.

Joint Council of Scientific Societies

1. A drafted bill on the registration of scientists was presented to scientific societies for their final comment. The bill will be forwarded to the Minister of Environmental Planning and Energy afterwards who will present it at the coming session of Parliament.
2. The Joint Council expressed it's concern on the significant pay differences between medically orientated graduates and engineers versus natural scientists in the SADF. The JCSS will take up this matter with the authorities.

Forum Botanicum

Five issues of Forum Botanicum were issued in the current year. The Editor was requested to draft a schedule for contributions on activities of Universities and In-

stitutes. Ted Oliver and Mienkie Welman are doing a great service to our Society and deserve much more than only moral support. Thank you very much, to both of them.

National Journal of Botany

A number of efforts were made to interest various people in the editorship. Prof. N. Grobbelaar decided to accept after some moral pressure was exerted upon him. He is excellently suited for the position since he is also a member of the Council of the Bureau for Scientific Publications which publishes National Journals under the wings of the Foundation of Education, Science and Technology. After discussions by Prof. Grobbelaar at very high level, some changes are being made which may lead to the amalgamation of one or more of the existing South African Journals with the National Journal of our Organisation under a full-time Editor.

If these discussions succeed it will be a happy ending to the saga of SAAB and the National Journal stretching over a period of many years. Prof. Nat. Grobbelaar deserves our highest appreciations for everything that he has done on our behalf, and we hope that the first issue will appear in January 1981.

Pretoriase Nasionale Botaniese Tuine

Op 25 Oktober 1979 is 'n aksie waarin die SAGP 'n groot aandeel gehad het, voltooi toe die Pretoriase Nasionale Botaniese Tuine as 'n Nasionale Gedenkwaardigheid verklaar is by 'n luisterryke geleentheid.

Lidmaatskapsertifikate

Die Raad beywer hom tans vir die ontwerp en uitreiking van lidmaatskapsertifikate en om dus aan 'n besluit wat jare gelede geneem is, uitvoering te gee. Dr Bernard de Winter en die kunstenaars verbonde aan sy Instituut word hartlik bedank vir hulle moeite.

Kongresreëlings 1980

Dit is vir my baie aangenaam om Prof. Dick Pienaar en al sy medewerkers baie hartlik te bedank vir al die uitstekende organisering met betrekking tot ons kongres in Pietermaritzburg vanjaar. Dit wil voorkom asof ons SAGP-kongresse elke jaar nog steeds verbeter.

Grondwetregstellings

Een van ons lede Dr D.J.B. Killick het op enkele foute in die Grondwet gedui en nadat die dagbestuur die Grondwet meer deeglik deurgewerk het, is nog 'n aantal redaksionele foute opgespoor wat deur ons Sekretaris Dr Pieter Keulder in die vorm van 'n errata strokie wat in die Grondwet geplak kan word, reggestel is.

Bedankings

Ek wil baie graag al die persone wat die aktiwiteite van ons Genootskap bevorder het van streeksvlak tot Nasionale Vlak baie hartlik bedank vir die uitstekende werk wat hulle gedoen het. 'n Spesiale woord van dank aan die Raadslede wat dikwels teen eie onkoste Raadsvergaderings bygewoon het. Veral aan Prof. N. Grobbelaar ons uitgetrede President baie dankie vir sy wonderlike ondersteuning en ywerige inisiatief namens ons Vereniging. Ons Sekretaris Dr Pieter Keulder en Tesourier Dr Johan Venter verdien ons diepe dankbaarheid vir die uiters pligsgetroue en bekwame wyse waarop hulle hulle pligte gedoen het. Indien hulle enigsins betaal moes word vir die tyd wat hulle bestee het aan SAGP-verpligtings, was ons lankal bankrot. Aan die lede van ons Raad wat aftree no. Prof. G.C. Bate, Mnr C. Boucher, Dr A.F.M.G. Jacot-Guillarmod, Prof. T. Steinke en Prof. J.J.A. van der Walt, baie dankie vir u hoogsgewaardeerde bydrae, veral aan Dr Amy Jacot-Guillarmod wat vanaf die ontstaan op die Raad van die SAGP was, ons hartlike dank.

S.A.A.B. ANNUAL CONGRESS: The 1980 Congress was held at the University of Natal, Pietermaritzburg, from Thursday 17th - Saturday 19th January. The Congress took place in the new Commerce Block, while delegates were accommodated in the Eleanor Russell Hall (where the "open" washrooms caused a few embarrassing surprises amongst both sexes). Professor P. de V. Booyesen, Vice-Principal, University of Natal in Durban, welcomed delegates to the Congress. In his opening speech he outlined the dilemma caused by the conflicting priorities of agriculture and nature conservation. Most of the lectures of this Sixth Annual Congress contribute to the main theme namely "Phycological Research in South Africa". The guest speaker was the wellknown Dr Sylvia Earle from the United States who gave a fascinating illustrated talk on "Tropical Deepwater Algae - strategies for survival with little light:. Two parallel sessions were held almost throughout the whole Congress, with about 20 lectures devoted to the main theme. There were also two short sessions on Wood Anatomy and Mangrove Physiology. A feature new to SAAB Congresses was the poster session where 18 projects were displayed and explained, a most successful venture. A visit to the beautiful Natal Botanic Garden (which forms part of the National Botanic Gardens of South Africa) was led by Prof. H.B. Rycroft, Director of N.B.G. The Annual General Meeting of SAAB was held on the Saturday at 16h10 when it was announced that the 1981 Congress will be held at the University of Port Elizabeth, while SAAB will join the AETFAT Congress in Pretoria in January 1982. The new Council for 1980 was also announced (listed elsewhere). The Annual SAAB Dinner was held in the Petrie Hall on Saturday, 19th January. The guest speaker was Prof. S.C. Seagrief who, in a short speech, spiced with typical humour, made a plea for PMB (Please, More Botanists). The bronze SAAB Junior Medal for the best doctoral thesis presented at a South African University during 1978, was presented to Dr P.D.F. Kok of the University of Pretoria for his thesis entitled:

"'n Hersiening van Digitaria Haller (Poaceae) in Suidelike

Afrika." Towards the end of the evening the proceedings were livened up by a short "cabaret" presented by students and professors of the Botany Dept of the University of the Witwatersrand. During the congress there were two other occasions during which delegates could meet socially, namely a cocktail party presented by the University of Natal and the Civic Reception in the historic Pietermaritzburg City Hall. The local organising committee (Chairman Prof. R.N. Pienaar and Secretary-Treasurer Dr. N.A.C. Brown) must be thanked for their excellent organisation and hard work in making this Congress such a great success.

Two post-congress excursions, each lasting about three days, were organised, namely to the Natal South Coast to study marine algae and to the Natal Drakensberg to study the Upland flora and ecology. Dr C.M. Breen, assisted by Mr E.G.J. Akhurst, led a party of about 20 persons, (including two very young girls) to their eventual destination the Mont-aux-Sources Hotel in the Royal Natal National Park. Two vehicles were used and it was only fitting and traditional for a SAAB excursion that one of them broke down. However, the combined mechanical knowledge of the assembled male botanists saved the day. A visit was made to the Cathedral Peak Forest Reserve on the first day of the excursion. Going up Mike's Pass was indeed a breathtaking experience! Botanizing at this high altitude was rather hampered by one of the almost daily heavy summer afternoon thunderstorms. Two walks were offered on the Monday, namely a high altitude ramble to see forest remnants and grassveld. Mention must be made here of Prof. E.A. Schelpe's enthusiastic collecting of mosses and ferns, educating fellow botanists at the same time. An easy low altitude walk was again enjoyed by most participants on the Tuesday morning, while some people decided to rest or go horse-riding (of course bearing in mind what not to wear on such an occasion). Many thanks go to Dr C.M. Breen and his helpers for arranging this interesting and enjoyable excursion to the Natal Drakensberg. Thanks are also due to the friendly and helpful officials of the Natal Parks Board, notably Mr J.S.B. Scotcher who, on the Sunday night, gave an illustrated account of their research activities in the Drakensberg area.

A report on the Natal South Coast excursion will appear in a future issue of "Forum Botanicum". (W.G.W.)

LIDMAATSKAP: Die volgende nuwe gewone lede word verwelkom

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SAAB CONGRESS, 1980, SUMMARIES OF THE PAPERS DELIVERED: For the information of members who were unable to be present at the recent congress and as a more permanent record we reproduce the summaries as printed in the programme.

POSTER SESSION/PLAKAAT SESSIE

- H. BAIJNATH** Studies in the genus *Eriosperrum* Jacq. (Liliaceae).
- H. BAIJNATH et al** Research into the genus *Ficus* L. (Moraceae)
- C. E. J. BOTHA** Leaf plastochron index in relationship to free and protein amino acids in
J. S. S. GRAY leaves of *Gomphocarpus physocarpus*.
J. M. BRAND
- C. E. J. BOTHA** A light and electron microscope study of the vascular tissue in leaves of
R. M. CROSS *Felicia muricata*.
- C. M. BREEN** Man and the Pongola flood plain.
K. ROGERS
F. ROGERS
J. HEEG
- H. F. GLEN** Computer graphics as an aid to taxonomy
- J. U. GROBBELAAR** Limnology of the Orange River.
P. STEGMAN
- P. C. KEULDER** Hydrochemistry of the upper Orange river catchment.
- A. B. LOW** A preliminary account of phytomass and nutrient studies in dune scrub
vegetation of the Cape Flats.
- A. B. LOW** Campus nature reserve – a base for ecological teaching and research.
- R. LUBKE** A proposed marine reserve on the Eastern Cape Coast.
- E. M. MARAIS** Die taxonomiese waarde van stuifmeel van *Pelargonium*
- S. J. MILTON** The exotic *Acacias*.
- A. J. H. PIETERSE** The relationship between chlorophyll *a* and inorganic N and P in
C. A. BRUWER Rooideplaas dam during 1976, 1977 and 1978.
- E. RETIEF &** The taxonomic value of seed surface ultra structure
P. HERMAN
- K. ROGERS** *Potamogeton crispus* L. and its epiphyton: their role in the functioning of
F. ROGERS the pans of the Pongola river flood plain.
C. M. BREEN
- J. C. SCHEEPERS** N A K O R National plan for nature conservation.
- S. C. SEAGRIEF** Seaweeds of Maputoland
- M. J. WELLS** Progress with the national weed list

AMORY, A. & CRESSWELL, C F.

The effect of inorganic nitrogen ions on formate production in *Themeda triandra*.

Infiltration of increasing levels of nitrogen supplied as potassium nitrate and ammonium chloride and infiltration of methionine sulfoximine an inhibitor of glutamate synthetase and 2 Pyridylhydroxymethane — sulphonic acid, an inhibitor of glycolate oxidase resulted in increased levels of formate production in detached leaves of nitrogen starved *Themeda triandra*. Infiltration of nitrogen with the inhibitors also affected and rate of formate production. The results are discussed in terms of how the inorganic nitrogen ions appear to influence the flow of carbon through a photorespiratory pathway

BAIJNATH, H. & PERRY P.

Studies in the genus *Eriospermum* Jacq. (Liliaceae)

The taxonomy of this interesting liliaceous genus is unsatisfactory possibly because of inadequate herbarium material. Observations on 25 samples of a population of *E. natalense* Bak., indicated that variation occurs in some vegetative characters but that the micromorphological features of leaves are quite similar. In this poster, some characters of 11 species are illustrated.

Several notable features were observed including the following: (i) leaves are amphistomatic and no distinct costal and intercostal zones occur; (ii) stomata are of the anomocytic type, that is, no subsidiary cells occur; (iii) shapes of epidermal cells and sculpturing generally differed on both leaf surfaces of each taxon; (iv) ornamentation includes striae and papillae and (v) trichomes when present are unicellular and usually with surface striations.

It was noted that no broad overall trends occur in surface characters as recorded in the genus *Kniphofia* Moench. Nevertheless, leaves presented several characters which could be of diagnostic value.

BAIJNATH, H. *et al.*

Research into the genus *Ficus* L. (Moraceae) in Natal.

This paper is a progress report on several species of the genus especially those in the *F. natalensis* complex. To achieve an understanding of this much debated complex a multidisciplinary approach is being applied; with several individuals contributing to the project. Several interesting aspects have already emerged, some of which are enumerated. (i) A re-evaluation of morphological characters revealed several overlooked or little stressed characters. (ii) Anatomical investigations of leaves show some striking differences both in transverse sections and surface observations. (iii) Ultrastructural observations are facilitating both the interpretation and possible function of cystoliths. (iv) Observations of pollinators have been very encouraging and the long established version of species — specific pollinators may require some reconsideration. (v) The preliminary findings on wood chemistry of *F. natalensis* Hochst., and *F. petersii* Warb., are very promising, as diagnostic patterns have emerged.

BARLOW, D. J.

Fine structure of toxic *Microcystis aeruginosa* Kütz. Emend. Elenkin cells grown under different light regimes.

Success of the waterbloom-producing, toxic Cyanophyte *Microcystis aeruginosa* can be attributed both to buoyancy regulation of gas vesicles and physiological adaptation of cells over a range of light intensities. Growth rates were similar for intensities of 3600 to 18000 lux, indicating that light saturation was reached at relatively low light intensities. Intensities of less than 720 lux and greater than 18000 lux were unable to support vigorous growth. Cells grown at high light intensities (18000 lux) showed an increase in polyglucoside and gas vesicle content and a decrease in expanse of thylakoid membranes, which were orientated singly perpendicular to the cell wall. The chlorophyll a: carotenoid ratio decreased, culture flasks appearing yellow. The converse occurred at low light intensities (720 lux), numerous thylakoids being stacked parallel to the cell wall. Polyglucosides and gas vesicles were fewer, and culture vessels coloured green. Changing light intensity initiated a morphological response within 24 hours. Ageing, manifested by thylakoid vesiculation, cyanophycin storage and cytoplasmic shrinkage, did not affect thylakoid arrangement. Carotenoid pigments and gas vesicles probably function in light shielding of cells, whilst changes in thylakoid organization indicate the remarkable adaptive qualities of this alga.

BARLOW, R. G.

Physiological studies on phytoplankton in the Cape Peninsula upwelling region.

Variations in the concentrations of chlorophyll a, ATP, protein and carbohydrate in phytoplankton, and the carbon-14 uptake into protein and carbohydrate fractions, has been investigated in the upwelling region off the Cape Peninsula. During active upwelling temperatures less than 10°C, high nutrient concentrations and low concentrations of the biochemical constituents were measured. When upwelling lessened and conditions stabilised temperatures increased and blooms of phytoplankton appeared. High concentrations of chlorophyll a and ATP and a high protein-carbohydrate ratio were then recorded. Nutrient concentrations decreased with the appearance of the blooms and when the concentration of nitrates was very low chlorophyll a and ATP concentrations remained high but an increase in the acid-soluble carbohydrate content and a

corresponding decrease in the protein-carbohydrate ratio was observed. The effect of light intensity on the uptake of carbon-14 revealed a higher incorporation of the isotope into polysaccharides in the upper layers of the euphotic zone. However, at lower light intensities near the bottom of the euphotic zone a higher proportion of carbon-14 was detected in the protein fraction.

BARNABAS, A. & GUILLARD, V.

Some aspects of sieve element structure in the leaves of *Zostera capensis* Setchell.

Sieve element structure in longitudinal leaf veins of the marine monocot *Zostera capensis* was investigated by light and electron microscopy. It was found that sieve elements are sieve tube members since they possess distinct end walls containing specialized sieve areas. The sieve tube members are arranged in vertical series forming sieve tubes.

Morphologically mature sieve tubes are lined with a parietal layer of cytoplasm, bounded externally by a plasmalemma. The parietal cytoplasm consists of modified endoplasmic reticulum, mitochondria, P-protein and plastids with cuneate crystalloids. An unusual component of the sieve tube protoplast is osmiophilic bodies which resemble the refractive spherules in sieve elements of certain ferns and mosses. In addition to primary walls the majority of sieve tubes also possess nacreous walls.

The resemblance in general structure of sieve tubes between *Z. capensis* and terrestrial monocots suggests that in spite of the plant's submarine existence, a similar mechanism for the translocation of solutes may operate in both.

BARRETT, D. & CRESSWELL, C. F.

Comparative study of carbon dioxide exchange in the C³ & C⁴ Photosynthetic forms of the grass *Alloteropsis semalata* (R. Br.) Hitch

The "Kranz" & "non-Kranz" forms of *Alloteropsis semalata* have been found growing adjacent to one another on the Transvaal Highveld. These two forms have been cultivated in the greenhouse and in the phytotron of the University. The carbon dioxide exchange characteristics of the two forms have been studied in the laboratory.

In this study the rate of carbon dioxide exchange has been measured with respect to varying temperatures, and with duration of time under both dark and light conditions. The response to light and dark treatment are discussed. The photosynthetic response to varying light intensity was investigated and the carbon dioxide compensation points were determined.

The anatomical classification into C³ and C⁴ forms was supported by the typical physiological responses observed.

BOTHA, C. E. J., GRAY, J. S. S. & BRAND, J. M.

Variation in free amino acid composition in *Gomphocarpus physocarpus* with leaf age.

The Leaf Plastochron Index (LPI) has been applied to a comparison of the free amino acids in leaves of *G. physocarpus*. The data show that a fairly substantial compositional change takes place with increasing leaf age. These results establish that care must be taken when analysing free amino acid pools of plant material and that the terms young, mature and old leaf or plant material cannot be loosely applied in such investigations.

BREEDENKAMP, G. J.

Groeeringsanalise en Hoofkomponente-analise as hulpmiddels vir die Braun-Blanquet-Klassifikasie van plantegroei.

In 'n Braun-Blanquet-opname van die plantegroei van die Manyeleti-wildtuin, geleë in die dorre laeveland (Acocks, 1975), is gevind dat die Braun-Blanquet routabel uiters kompleks en ingewikkeld is, waaruit sinvolle groepering van relevênsies spesies deur middel van die semi-intuïitiewe subjektiewe Braun-Blanquet-tegniek besonder moeilik is. Na herhaalde pogings is 'n suksesvolle klassifikasie egter daargestel. Om hierdie klassifikasie egter teenoor meer objektiewe statistiese metodes te toets, is van 'n groeeringsanalise en 'n hoofkomponente-analise gebruik gemaak. 'n Verbasende ooreenstemming tussen die resultate van die drie tegnieke is gevind. 'n Vergelyking van hierdie resultate word op twee hiërargiese vlakke, naamlik dié van hoofplantgemeenskap en dié van eindplantgemeenskap aangebied. Die bydrae wat die statistiese klassifikasie en ordeningstegnieke in die Braun-Blanquet-klassifikasie van plantegroei kan lewer, word aangetoon.

BREEN, C. M., ROGERS, K., ROGERS, F. & HEEG, J.

Man and the Pongola Floodplain.

These studies were aimed at assessing the effect on the Floodplain of the impounding of the Pongolo in the Pongolapoort Dam. Justification of the investigation lay in (i) the uniqueness of the ecosystem, the only coastal floodplain with a well developed pan system in the Republic, (ii) the biota representative of more northern tropical conditions, and (iii) the key role of the floodplain in the subsistence economy of the indigenous population.

The investigation shows clearly that the ecosystem is wholly dependent upon fluctuations in riverflow and water level which characterise the normal flooding regime of the Pongolo. Primary production and energy input patterns are such as to provide a winter feeding ground for large numbers of waterfowl, fish breeding is flood dependent, spawning only occurring when ample food and shelter are available; agricultural practices are established on a pattern which utilizes the effects of the floods. Both timing and duration of floods are vital to the maintenance of the system. Possible means for optimizing water use to permit maintaining the floodplain while still realizing the agricultural potential of the area are suggested.

BUZER, J.

Preliminary studies on soil algae from around a highveld pan.

Soil algae are of especial interest in that they are essentially aquatic organisms living in relatively dry habitats. Soils from the margins of a highveld pan were selected for the present study because they are subject to large changes in moisture content.

Information on the ecology of soil algae is scarce, partly owing to problems in developing suitable techniques for study, especially for quantitative assessments. These problems are discussed using examples from the pan investigated.

CHOVEAUX, N.A., DAVEY, J.E. & VAN STADEN, J.

Changes in the level of cytokinins in internodal bark segments of *Salix babylonica* L. during aseptic culture.

Internodal bark segments of *Salix babylonica* L. were cultured aseptically for 10 days. During this period, the exposed cambial region underwent cell division to form a callus. The addition of auxin to the culture medium increased the rate of cell division. In both cases, the cytokinin content of the bark segments increased markedly until 6 days of culture after which it decreased. However, the increase was 700% greater in the segments cultured without auxin than in the segments cultured with auxin. These results indicate that stem tissue has the ability to produce cytokinins and support the proposal that the cambial region may be a site of cytokinin synthesis.

CRESPO, H.M. & CRESSWELL, C.F.

Differences in photosynthetic characteristics in the leaves of *Zea mays* seedlings.

The first-formed leaves of *Zea mays* plants grown under phototon conditions produce predominantly malate and aspartate as the initial CO₂-fixation products, despite the absence of certain C₄ characteristics in these leaves. The photosynthetic characteristics of later-developed leaves are entirely typical of C₄ plants.

The 13C/12C ratios, and differences in ultrastructure of the leaves are discussed.

CHRISTIE, H. L. M. & STEWART, J.

A preliminary taxonomic study on the genus *Sargassum* Agardh in South Africa.

An investigation of the morphology of 150 specimens of *Sargassum* collected off the South African coast has revealed that at least five species are currently represented in our marine flora. A detailed examination of vegetative and reproductive features demonstrated that although the morphology of the plants change with age and the environment characters of the 'laterals' on sargassum plants are the most useful taxonomically. Features of the axes and receptacles were also useful, despite the variation in the latter with regard to position and sex. No one character could be used alone to distinguish any of the species except *S. longitolum*.

CLIFF, G.

Phytoplankton and seaweed detritus in nearshore, marine environment.

Research has been carried out on a number of South African nearshore reef communities. On exposed reefs, the fauna is found to be dominated by filter feeders.

Under certain conditions, coastal upwelling may stimulate phytoplankton production inshore, but generally phytoplankton stocks appear to be too low to meet the food requirements of the filter feeders.

Detritus in suspension is present in large amounts inshore. The identity of this material is difficult to determine but it is probably fragmented seaweed material. This detritus, in conjunction with the bacteria and other microheterotrophs, is the largest source of organic input to the reef ecosystem.

COETZEE, J. C., TRENDLER, R. & EICKER, A.

Die kweeking van *Macrolepiota zeyheri* (Fr.) Sing., 'n eetbare inheemse sampioen.

Macrolepiota zeyheri (Fr.) Sing., is een van die beste eetbare veldsampoene inheems aan Suid-Afrika. Sover bekend is al die verteenwoordigers van die genus *Macrolepiota* eetbaar, maar feitlik geen navorsing ten opsigte van die moontlike verbouing van hierdie groep sampioene is nog gedoen nie.

Werk uitgevoer in die fitotron aan die Universiteit van Pretoria het aangetoon dat *Macrolepiota zeyheri* wel onder gekontroleerde toestande gekweek kan word. Hierdie werk, asook aspekte betreffende die voedingswaarde van die sampioen, sal bespreek word.

COLLINS, M. & BATE, G. C.

A simulation model for nitrogen metabolism in a germinating maize seed.

Using theoretical data, a model system of nitrogen metabolism in a germinating *Zea mays* seed was constructed in which the nutrient status of the germinating solution could easily be manipulated in order to gauge its effect on the level of protein being produced.

The model allows for the absorption of nitrogen in different forms, its conversion after entry to the seed and its incorporation into amino acids and ultimately into protein. Different enzyme reactions as well as the factors which influence the rate of the reactions were tested to determine their effects on the level of protein being produced. An indication of the rates of turnover of the metabolic pools will give some clue to the dynamics of the system.

COWPER, B.

An investigation into the distribution and fine structure of algae epiphytic on moss plants.

A vast range of algal species are found attached to plants. While several investigations have been conducted relating to their distribution on aquatic macrophytes, very little is known about the distribution and actual mechanism of attachment of epiphytes onto mosses.

Algal growth from liquid and plate cultures was investigated using the L.M. and the presence of algal species in each sample was recorded. The results obtained were subjected to a statistical analysis to determine the distribution of algae within the top, middle and bottom zones of each moss species.

The mechanism of epiphyte attachment has been investigated using SEM and TEM techniques.

DAVEY, J. E. & VAN STADEN, J.

Cytokinins in the fruits of *Lupinus albus* L.

Cytokinin-activity associated with white lupin (*Lupinus albus* L.) fruits was studied at intervals after anthesis. During the 12 day period immediately after anthesis the cytokinin level rose markedly. At two weeks after anthesis the fruits were divided into pod wall and seed fractions. At this time the level of activity associated with the pod wall was greater than that present in a seed. However, at four and at six weeks after anthesis a greater level of activity was associated with a seed than with the pod wall. At these times the cytokinin activity in the seeds was associated mainly with the endosperm. By 10 weeks after anthesis the level of activity in the pod wall had increased while that associated with the seeds was reduced. Changes in the distribution of cytokinins in the pod wall and seeds will be discussed in relation to the possible role of cytokinins in fruits.

DE VILLIERS, O. T. & MARAIS, H. J.

Die invloed van Diuron en Prometryne op fotochemiese reaksies in geïsoleerde chloroplaste.

Dit is gevind dat die onkruidodders Diuron en Prometryne fotosintese in geïsoleerde chloroplaste uit blare van *Phaseolus vulgaris* inhibeer. Om die presiese plek van inhibisie te bepaal, is hulle invloed op elektrontransport in PS I en PS II in die chloroplaste nagegaan. M.b.v. kunsmatige elektron donors en -akseptors vir PS II is vasgestel dat beide onkruidodders elektrontransport aan die reduserende kant van PQ inhibeer. Die onkruidodders se invloed is ook op sikliese- en nie-sikliese fotofosforilering, asook op die ATPase-aktiwiteit in die chloroplaste nagegaan.

DODD, M. C.

Early flowering in the tobacco cultivar Kutsaga E 1.

Kutsaga E 1 tobacco was found to be a quantitative short day plant, which reached the stage of ripeness to flower at an early age. In this cultivar final leaf number is controlled by the onset of floral initiation. The response of Kutsaga E 1 seedlings to temperature and day length was studied during the seedbed stage of growth. Final leaf number was correlated to both maximum and minimum temperatures. Water stress and mineral nutrition in the seedbed were shown to affect the size of the plants, thus influencing the time when the seedlings achieved ripeness to flower. Additional growth room studies showed that the short day response could be modified by the night temperature. Under low night temperature conditions the plants became receptive to the floral stimulus from the light leaf stage onwards.

DOWNING, B. H.

Woody and grass community ratios in parts of Zululand subsequent to Henkels research in 1936.

Research findings by Henkel on tsetse flies in 1936 indirectly affected the ratio of woody grass communities in parts of Zululand. Bush clearing recommended by Henkel did not prevent breeding of the flies, but produced a secondary grassland which became a focal point for later research in Umfolozi Game Reserve. Recent measurement showed that the woody species previously dominant are regenerating according to the soil series present. Slaughter of thousands of animals also failed to eliminate the flies but retarded thicket encroachment. Encroachment was more rapid in the Hluhluwe Game Reserve where shootings were minimal. Comparison of a recent map with that of Henkel showed a 5% increase in the extent of forest at the expense of grassland, which decreased by 8%.

DOWNING, B. H. & GIBBS RUSSELL, G. E.

Phytogeographic and Biotic Relationships in Southern Africa: analysis of an angiosperm checklist from *Acacia* woodland in Zululand.

Floristic analysis of a list of 425 species revealed some essential floristic and physiognomic features of a semi-arid woodland or savanna represented in the Umfolozi Game Reserve, which is almost exclusively dominated by *Acacia* species and graminoid forms. A poor representation of the forbs was ascribed to foraging and trampling by indigenous herbivores. An exceptionally low presence of species of Orchidaceae and Asclepiadaceae was apparently due in part to elimination of their insect pollinators when DDT was applied to control tse-tse flies some 30 years ago. The Reserve appeared as a unique, southernmost limit of *Acacia* woodland of the Zambezi Domain. Few species typical of other phytochoria in the Indian Ocean Coastal Belt are present, but many species of Tiliaceae and, particularly, Ebenaceae are characteristic of the Tongaland-Pondoland Regional Mosaic.

DOWNING, B. H. & MARSHALL, D. J.

Cation content and phytomass of roots and shoots in a grass-fynbos community defoliated by fire and grazing treatments.

Measurements in a number of plots showed that grass root phytomass was increased by frequent defoliations. A maximum root mass in control plots was ascribed to woody plants of *Erica brownleeae*, *Cliffortia paucistaminea* and *C. linearifolia* and other heathland shrubs. Triennial and quadrennial burnings resulted in greatest aerial production, whilst annual grazing showed lowest standing crop. Controls contained more litter than living grass because of competition from dominant shrubs. Frequent defoliations generally resulted in an increase in concentration of the nine elements tested and in crude protein content.

DRENNAN, P. & BERJAK, P.

Degeneration of foliar glands correlated with the shift to abaxial salt excretion in *Avicennia marina* (Forsk.) Vierh.

Avicennia marina, the primary coloniser of the South African East Coast mangrove swamps, is characterised by salt excretion at the leaf surfaces.

However, the occurrence of functional salt glands becomes less and less frequent as the leaf matures, and the present study has shown that, in fact, glandular degeneration accompanies lamina expansion.

Loss of structural integrity of the adaxial salt glands is accompanied by a shift of salt excretion to the abaxial surface alone. However, abaxial glandular degeneration also occurs and evidence exists that the saline solution is then excreted via the stomata of the mature leaf.

DRENNAN, P. & PAMMENTER, N. W.

Salt Secretion in the Mangrove *Avicennia marina*.

Diurnal and long term (months) Na^+ secretion by leaves of *A. marina* seedlings growing in aqueous culture was correlated with substrate salinity and transpiration rates.

Maximum secretion occurred at night with a minimum at midday. In the long term there was a positive correlation between secretion and transpiration for all substrate salinities. Transpiration was higher in plants growing in 50% than in 100% sea water but the reverse was true for salt secretion. The different slopes of the secretion-transpiration correlations between the two salinities reflect the differences in the xylem sap salt concentrations.

Root and xylem sap Na^+ contents were found to be linearly related to substrate salinity, in accord with concepts of ultrafiltration at the root level. However, leaf Na^+ is logarithmically related to substrate salinity, increasing to a maximum, indicating that control of leaf salt content lay at the leaf rather than the root level.

DU TOIT, P. C. V.

Morphological studies in the Ochnaceae.

The nodal complex of the Ochnaceae is described and argument is put forward showing that, as far as the Ochnaceae is concerned the terms node and internode are confusing and are best replaced by nodal complex.

DYER, C. & BATE, G. C.

The development of stomata in *Ochna pulchra* (Hook) Leaves.

Previous work has shown that the emerging leaves of *Ochna pulchra* do not photosynthesise or differentiate completely until after an initial lag period. Studies were conducted to determine when the stomata became fully functional.

The stomata remained covered for between four and eight days after bud break by a cuticle. Scanning electron microscopy has shown that the cuticle starts breaking from either end of the stomatal pore which remains completely closed until the cuticle over the pore has disintegrated.

The stomata on the veins of the abaxial surface of the leaf appeared to become functional before those between the veins. No stomata were apparent on the adaxial surface.

A similar lag in stomatal development was not apparent in *Burkea africana* or *Terminalia serecea*, which starts transpiring as soon as the leaves emerge.

EARLE, S. A.

Tropical deep-water algae — strategies for survival with little light.

Even in clear ocean water, light is quickly absorbed. Less than one per cent of surface light remains below about 100 m and only blue and green wave lengths penetrate below about 10 m. Accessory pigments of red, green, and brown algae gather light not available for photosynthesis in the presence of chlorophyll alone. Many kinds also have structural adaptations, cellular as well as general form, that may be useful for enhancing the effect of light present. Particularly in clear tropical seas, the depth suitable for benthic plant growth is generally underestimated. Based on direct observations, the general depth is shown to be approximately 200 m, not 100 m as is generally stated. Productivity in the sea may thus be underestimated. A review of tropical marine algae, their distribution, pigments, and structural adaptations for low light intensity are given. Methods used to make field observations (diving, dredging, submersibles) are illustrated.

ELLIS, R. P.

Leaf anatomy of the *Merxmüllera* species of the Drakensberg mountains.

The anatomical structure of the leaf blade as seen in transverse section, and of the abaxial epidermis, of the seven summer-rainfall *Merxmüllera* species occurring in South Africa will be described and illustrated. Two major "groups" can be recognised on anatomical grounds: the *M. disticha* group consisting of *M. disticha*, *M. davyi* and *M. macowanii* and the *M. stricta* group which includes *M. stricta*, *M. guillarmodiae*, *M. stereophylla* and *M. drakensbergensis*. *M. aureocephala*, a winter-flowering species, is intermediate between these two groups. In each "group" distinct anatomical forms are correlated with the following habitats: alpine bogs, alpine rocky situations, alpine and montane streambank habitats, montane basalt localities and each has a form widespread in the Cape Province and extending into Cape sandstone habitats in the Drakensberg. There is little agreement between the existing classification of these *Merxmüllera* species and the results of this study.

ELOFF, J. N.

The influence of bacteria on the light sensitivity of *Microcystis* cultures.

It could be shown that natural populations of *Microcystis* are much more resistant to light intensity than axenic laboratory cultures. Recontamination of cultures with bacteria present in original freshly isolated culture protected the *Microcystis* cultures against the light inhibition effect. This protection also took place when the bacteria were present in a separate container within the culture flask indicating that the protection is due to a gaseous exchange effect. It is postulated that the protection is due to the increased CO₂/O₂ ratio caused by bacterial respiration.

EVERSON, C. & BREEN, C. M.

Autecological studies on *Philippia evansii* M.E.BR. with particular reference to water relations.

Catchment IX was originally predominantly grassland, and protection from fire has resulted in a marked invasion of *Philippia evansii* onto the south facing slopes, into communities previously dominated by *Themeda triandra* Forsk., *Rubus ludwigii* Eckl. and Zeyh and *Buchenroedera lotononoides* Scott Elliott (Granger 1976). There was however, no invasion of *P. evansii* across the valley floor onto the north facing slopes (i.e. onto areas receiving high radiation). Granger (1976) concluded that radiation and the associated influences of aspect, slope, albedo and temperature appeared to be the most important in controlling these vegetation changes.

The present study has shown however, that radiation may not be the most important factor controlling the distribution of *P. evansii* in Catchment IX. Instead a combination of the effects of soil moisture, radiation, fire and competition with *Pteridium aquilinum* (L.) Kuhn appear to have been of most significance.

FREAN, M. L. & CRESSWELL, C. F.

Quantitative assessment of anatomical and ultrastructural variation in C₃ and C₄ photosynthetic forms of *Alloterpis semialata* (R.Br.) Hitchc.

Alloterpis semialata (R.Br.) Hitchc. is a grass species known to show marked morphological and anatomical intraspecific variation within a single ecological environment. This study further investigates anatomical and ultrastructural differences between C₃ and C₄ photosynthetic forms of *A. semialata*.

Quantitative assessment shows significant differences in mesophyll and vascular bundle sheath cell size, and in size and distribution of starch grains, lipid droplets and cell organelles in the two forms. These differences are discussed.

Measurements were made using a Digiplan electronic planimeter on transmission electron micrographs of mature leaves sectioned transversely at mid-lamina.

GLEN, H. F.

Computer graphics as an aid to taxonomy.

This display is intended to show the utility of computer graphics, which need not be expensive, in the practice of taxonomy. The mapping program in use at the Botanical Research Institute was written in BASIC in about a week. It is as simple as possible, and can be used to plot distributions of plant taxa, or vegetation types, or routes of plant collectors. Up to eight different symbols may be plotted in any of four colours on the same map. Diagrams of use in production ecology, ordination of vegetation, pattern analysis and histograms showing flowering times of plant taxa are plotted regularly. The use of digitising facilities in semi-automatic recording of taxonomic data and possibly in computer-aided identifications is being examined.

GLEN, R. P.

The first century of research on freshwater algae in Southern Africa.

The freshwater algae, in particular phytoplankton, were one of the last plant groups to receive attention of researchers in Southern Africa. The first species of marine algae was collected as early as 1672, the first fungi and lichens in 1772 and the first mosses in about 1823, while the first Southern African diatom was only described in 1845 by Ehrenberg.

Early research on freshwater algae was undertaken largely by overseas authorities who either visited South Africa or encouraged local collectors to collect these organisms. The collectors, as well as the known records of these algae, will be discussed. From a checklist that is being compiled, it is evident that the known distribution of these algae are restricted to the limited areas in which these collectors were active.

GRAY, V. & CRESSWELL, C. F.

The effect of air, nitrogen and DNP on endogenous nitrate disappearance and nitrite accumulation in maize roots.

Nitrite accumulates in roots and the surrounding medium under anaerobic conditions. Under aerobic conditions nitrite does not accumulate. This observation has been ascribed to two contradictory processes:

- a) That oxygen inhibits nitrate reduction
or
- b) That both nitrate and nitrite reduction occurs in the presence of oxygen gas.

It appears that oxygen instead of inhibiting nitrate reduction, maybe a requirement for nitrite reduction in roots.

DNP reverses the aerobic affect on nitrite reduction. Under aerobic conditions DNP may inhibit the reduction of nitrite.

GROBBELAAR, J. U.

Mass culture of algae and the upper limit of photosynthetic productivity.

Until recently, one of the major aims of research on the mass cultivation of algae was to produce food. Now, because of a world energy crisis, algal culture with an emphasis on biological solar energy conversion, is receiving renewed interest. Production rates approaching the theoretical maximum photosynthetic efficiencies have been attained. Through manipulation of the nutrient compositions of the growth medium, the cellular composition can be changed. Biomass is dependent on culture depth and production is influenced by CO₂ supply.

GROBBELAAR, J. U. & STEGMAN, P.

The Limnology of the Orange River. 1. The Austro-Afroalpine Region.

The mountain mass of Lesotho forms the most important catchment area in South Africa. Bogs occur in the riverheads and are important as filters releasing a regular flow of clear water to the streams. Streams draining, as well as pools on a bog, were studied. Extreme climatic conditions and changeability of the weather influence the physico-chemical and biological properties of this region. Heavy rainfall flushes the pools and streams, ridding them of most pelagic organisms. Rooted macrophytes and filamentous algae are common. The water composition is dominated by ions of edaphic origin and is of good quality. Large numbers of zooplankton were occasionally observed. The bogs are overgrazed and large numbers of ice-rates destroy part of the vegetation. Severe signs of erosion are seen and it is suggested that conservation measures be implemented.

GROENEWALD, E. G.

Die effek van sekere herbisiëde en oplosmiddels op die groei van *Microcystis aeruginosa*.

Water oplosbare en water nie-oplosbare herbisiëde is uitgetoets op die groei van *Microcystis aeruginosa*. Sekere oplosmiddels was ook uitgetoets. Die resultate sal bespreek word.

GUNTON, C. & BATE, G. C.

Aspects of nitrogen inputs and losses from *Burkea savanna* soils.

Rainwater analysis has indicated that the ratio of nitrate nitrogen to ammonia nitrogen varies with time of the year, the nitrate nitrogen being higher than the ammonia nitrogen at the beginning. As the season progresses, the amount of ammonia nitrogen increases. Ultimately, the total seasonal wet deposition is mainly ammonia nitrogen.

Soil nitrification experiments in the laboratory show that while ammonia is converted to nitrate during incubation, there are also what appear to be periodic losses of nitrate nitrogen from the system. Ammonia production can be detected and the source of this nitrogen is discussed as is the relevance of laboratory studies as an indicator of *in situ* nitrification.

KEEGAN, A. B., VAN STADEN, J. & DAVEY, J. E.

Effect of the seed coat and applied hormones on the germination of *Riciodendron rautanenii*.

Riciodendron rautanenii is more commonly known as the Manketti tree and it occurs in a distinct band across Central Africa, between 15 and 21° latitude. The endosperm of the Manketti seed is highly nutritious and it forms an essential part of the diet of the Owambo people of South West Africa. In any given sample of seed, a large proportion exhibit dormancy. The associated seed coats do not appear to initiate this dormancy by restricting gas exchange or by mechanically restricting radicle elongation nor is there any evidence for coat inhibitors. The hard woody testa appears to inhibit water uptake although conditions which enhance water uptake do not result in large scale germination. Excised embryonic axes can germinate on certain culture media and applied hormone treatments result in higher germination percentages. This indicates that the embryos are viable but the precise nature of the environmental stimulus needed for germination has not yet been determined.

KEULDER, P. C.

Hydrochemistry of the Upper Orange River Catchment

A four year pre-impoundment study of the catchment of the Hendrik Verwoerd Dam was conducted. The Orange River was the major source of dissolved chemicals and suspended sediments, while the Caledon River contributed 24 and 30% respectively, and the Kraai River 9 and 8% respectively. The upper reaches of the Orange River catchment contributed mainly to the dissolved chemical and sediment loads, in contrast to the minimal contribution of the lower reaches. This was in spite of the relatively stable geological formations in the upper reaches and the erodable formations in the lower reaches. Dry-wet seasonal variations occurred in nutrient and sediment concentrations and loads, except for the Bell River where constant values were measured. The water was characterized by magnesium and bicarbonate dominance. Adsorption by the suspended sediments was dominated by calcium (potassium in the Bell River) and zinc among the trace elements.

The phosphorus loading rate at the inflow of the Hendrik Verwoerd Dam was only 0.55 g P m⁻² a⁻¹, which was well below the 1.39 g P m⁻² a⁻¹ critical rate for eutrophic conditions, applying the Vollenweider Model. Therefore, this impoundment was classified as oligo-mesotrophic.

KOK, P. D. F.

Die omgrensing van *Digitaris ciliaris* (Retz.) Koel. en *D. sanguinalis* (L.) Scop.

Reeds voor die monografie studie van die genus *Digitaris* deur Henrard in 1950 het verskeie outeurs gewys op die probleem om die betrokke twee spesies van mekaar te onderskei. Henrard self het ook geen poging aangewend om die twee spesies duidelik van mekaar te onderskei nie. Verskeie outeurs het reeds voorgestel dat die twee taksons verenig moet word terwyl ander outeurs van mening is dat dit steeds as afsonderlike taksons beskou moet word.

Albei taksons kom in Suid-Afrika voor. Verskillende name is vir een van die spesies gebruik wat, tesame met die feit dat die twee taksons moeilik van mekaar onderskei kan word, heelwat verarring veroorsaak.

Die resultate van 'n ondersoek van die probleem in Suid-Afrika toon dat daar wel tussen die twee spesies onderskei kan word, dat sekere eksemplare nie bo alle twyfel in een van die spesies geklassifiseer kan word nie. Dit dui op 'n moontlike verbastering tussen die twee spesies.

KROMHOUT, C. P.

Anatomiese kenmerke van belang vir die mikroskopiese uitkenning van die vernaamste inheemse houtsoorte van Suid-Afrika.

Die mees betroubare en standhoudende houtanatomiese kenmerke, waarvolgens uitkenning gemaak kan word, is deur verskeie navorsers bepaal en beskryf. Hierdie kenmerke verskil egter van wêrelddeele tot wêrelddeele afhangende van die plantfamilies wat daar voorkom.

Die samestelling van die Suid-Afrikaanse boombevolking is van so'n aard dat 'n besondere stel kenmerke, in volgorde van betroubaarheid, ontwikkel is, waarvolgens identifikasies gedoen kan word.

In die loop van die werk wat gedoen is om die kenmerke te bepaal, is hout van 140 spesies van 46 families ondersoek.

LANGLEY, R.

Taxonomic studies in the genus *Xysmalobium* (Asclepiadaceae).

The genus *Xysmalobium* R. Br. as described by N. E. Brown in Flora Capensis 4 (1) (1907) was studied. It was found to be a heterogeneous taxon consisting of six genera, and it will be proposed that the species of *Xysmalobium*, as previously understood, will be apportioned between these genera.

LAWTON, J. R.

The Geoperceptive Node of Grasses.

Grass shoots have the ability to bend at the node and regain an upright position after having been flattened by wind etc. A search for the mechanism of this response has involved a study of the ultrastructural changes occurring in the stimulated area. Sedimentation of the plastids (statoliths) in the bundle sheath cells occurs within 5 min of stimulation of excised nodes of *Lolium temulentum*. Curvature is brought about by cell extension which is particularly noticeable in the elongated, thick walled cells of the bundle cap. Ultrastructural changes in the bundle sheath cells as a result of, or the cause of, sedimentation of the statoliths may be sufficient to trigger off the geotropic response.

LIENGMÉ, C. A.

Some interesting plant uses of the Tsonga people.

African plant lore and the knowledge of plant properties and uses is in danger of being lost unless recorded fairly soon. For this reason it was decided to gather information on plant uses, starting with the Tsonga people of the Eastern Transvaal lowveld. On the assumption that all plants that have Tsonga names have a use, approximately 500 names were extracted from a Tsonga - English dictionary. Information on the uses of about half of these plants was recorded. Only some of the more interesting and unusual uses are discussed.

LOW, A. B.

Variation in vegetation and soil analytical parameters along a moisture gradient in the Winterhoek Mountains.

At a site in the Groot Winterhoek valley, eight plant communities were found to occur along a moisture gradient stretching from a wet riverine habitat across a seasonally moist sandy plain to a dry rocky outcrop. The communities comprised riparian (1), flood plain (3), moist sandy plain (2) and rocky outcrop (2). Each exhibited specific characteristics with regard to floristics and physiognomy.

Differences in soil analytical parameters were also reflected by the community variation. pH varied from 3.69 - 5.35 while the following ranges were observed in organic material and total major nutrients - OM : 1.76×10^4 - 15.01×10^4 ; N : 503 - 2 712; P : 30 - 201; Ca : 151 - 4 746; Mg : 24 - 506; K : 39 - 154 and Na : 230 - 497 (quantities in kg ha⁻¹). Base exchangeable cations showed the following ranges - Ca : 98 - 3 772; Mg : 22 - 108; K : 17 - 101 and Na : 17 - 344. In general these levels were comparable with those found in fynbos and other heathland soils. However, several of the higher values were well above the upper ranges previously obtained for heathland systems. Levels of nutrients appeared to be positively correlated with OM content of the soil and this was confirmed by linear regression analysis. Sodium however exhibited a negative correlation with organic material. This element may therefore not be extremely important in plant metabolism in (certain) fynbos communities or species and appears to be accumulated in the soil.

Absolute inter-community differences in soil total, N, P, Ca, Mg and K would seem to be related to the amount of litterfall and organic build up in the soil rather than as a result of localized chemical differences in soil parent material.

LOW, A. B.

A preliminary account of phytomass and nutrient studies in dune scrub vegetation on the Cape Flats.

Allometric regression has been used in the determination of above ground phytomass in dominant dune scrub species on the Cape Flats. r^2 values for stem base circumference vs. shrub dry mass in *Metalia muricata*, *Euclea racemosa* and *Olea exasperata* were found to be significant at the 1% level. It appears therefore that allometry may be important in non-destructive phytomass studies in this vegetation, as well as a time and labour-saving method.

Nutrient pool studies in above ground parts of *Olea exasperata* have commenced with nitrogen determination. Levels of N ranged from 1.008 - 1.287% in the leaves and 0.365 - 0.690% in twigs and stems from five different diameter classes. Soil total nitrogen varied from 0.069 - 0.216%, being governed chiefly by the amount of organic material present. Nitrogen levels in *Olea* were similar to those of several species in coastal scrub occurring near Sydney, Australia. % soil N was also comparable between the two systems.

LUBKE, R. A.

A proposed marine reserve on the Eastern Cape Coast.

The area of the coast between the Riet and Kleinemonde Rivers is part of the 1820 Settler Farm, Tharfield. The present owner, Mr Tom Webb has maintained the coastal part of the farm as a private nature reserve.

The coast is relatively unspoiled by man, is scenically very beautiful and has an abundance of marine habitats which are of interest to biologists and conservationists in the Eastern Cape.

This poster paper described the various habitats and some of the work that has been carried out by students of the Plant Sciences department in the past few years. It is hoped that this section of the coast will be made a marine reserve with the establishment of a centre for continued research and education.

MARAIS, E. M. & VAN DER WALT, J. J. A.

Die taksonomiese waarde van die stuifmeel van *Pelargonium*.

Stuifmeel van 'n groot aantal spesies van *Pelargonium* is ondersoek om vas te stel of die stuifmeelmorfologie van taksonomiese waarde is. Voorlopige resultate dui daarop dat spesies op grond van die stuifmeelmorfologie in groepe verdeel kan word. Hierdie groepe stem tot 'n groot mate ooreen met die seksies en subseksies van Knuth (1912) wat die laaste taksonomiese hersiening van die genus gemaak het.

Daar word gewys op die korrelasie tussen stuifmeelmorfologie en blomstruktuur, en die bydrae van stuifmeelmorfologie tot die bepaling van verwantskappe van taksons.

Die vermoede wat bestaan dat sekere spesies verkeerdelik gegroepeer is, word deur stuifmeelmorfologie bevestig.

MEYER, S. R. & PIENAAR, R. N.

Preliminary studies on the micro-anatomy of a species of *Chroomonas* (Cryptophyceae).

The Cryptophyceae comprise a small group of phytoflagellates which, although not abundant in phytoplankton populations, are widely distributed in marine, brackish and fresh water habitats. This class of algae are characterised by their pigmentation (chlorophyll *a* & *c* & phycobiliproteins) and the possession of two pleuronematic flagella, a periplast and a subapical invagination, which varies in complexity in different species. The structures of the chloroplast and trichocysts are unique to the group. Ultra-structural studies have revealed the presence of nucleomorph, a nucleic-acid containing, membrane-bounded organelle, associated with the chloroplast.

Because the Cryptophyceae lack sexual stages, and the range of morphology within the group is small, the taxonomy is a problem. A further complicating factor is that the morphology of the cells vary in different environmental conditions. Ultra-structural studies have suggested features (periplast, arrangement of tubular mastigonemes of the flagella, mitochondria) which may serve as important taxonomic criteria. To date a limited amount of electron microscopy has been completed on this group.

Representatives of the Cryptophyceae have been reported from several localities in South Africa but little effort has been made to accurately identify the taxa, or to assess their importance in their aquatic ecosystems.

The *Chroomonas* species discussed in this paper was isolated from a water sample (salinity 35‰) collected from a tidal pool near Ysterfontein in the Cape Province, but it shows remarkable salinity tolerance. Preliminary studies suggest that this taxon possesses certain features which have not been given species status.

Some of the morphological variation in different culture conditions is also illustrated.

MILTON, S. J.

The exotic Acacias in South Africa.

The poster paper identifies those features which make the various species of exotic Acacias easy to identify, and it illustrates their current distribution. The shade-tolerance, growth rate, phenology and reproductive biology of the more common species are compared. *A. saligna* is seen to be adapted to a wide range of ecological conditions, to have a rapid rate of growth, a vast seed output and the ability to coppice - it is therefore probably the most difficult species to eradicate. The early growing season of the exotic Acacias, together with their rapid maturation, greater height and biomass and annual production of a large crop of dormant seed and limited predation, give them an advantage over slow-growing and low shrub vegetation types such as Fynbos. Some suggestions are made as to how autecological information could be applied to the utilization and control of exotic Acacias.

MOGFORD, D. J.

Chromosome banding in plants.

Over the past ten years various methods have been derived which enable chromosomes to be distinguished from each other on a basis of their linear patterns of DNA replication. An account is given of the early results of applying these techniques to plants, and of the potentiality which they hold for studying the evolutionary relationships of plants and the interphase organisation of plant nuclei.

MORRIS, J. W. & WHITTAKER, R. H.

Pattern in savannas at Nylsvlei - preliminary findings.

Results of applying a modern multivariate ordination technique to cover data from six strip transects, totalling over 2 km in length and laid out on the Savanna Ecosystem Project study site, Nylsvlei, will be

presented and preliminary conclusions will be discussed. The pattern of under-tree and open habitats is not as marked here as in other communities studied by R. H. Whittaker. Interesting hypotheses about the structure and function of savanna plant assemblages, with reference to soil nutrient status, the differences between *Acacia* spp. savanna and *Burkea africana* woodland and relationships between tree-covered and open habitats at the individual species level have, however, still been developed and are in the process of being tested.

NAIDOO, G. & KASAVAN, S.

Influence of aluminium ions on growth of *Phaseolus vulgaris* L. and possible sites of accumulation within roots.

Responses of Dade and Romano cultivars of snapbeans (*Phaseolus vulgaris* L.) to Al in nutrient solution were investigated. Plants of both cultivars treated for 12 days at 20 ppm Al at pH 4.6 exhibited typical symptoms of Al toxicity. Symptoms included root discoloration, reduced root and top growth and gelatinous root tips. The Romano cultivar also showed purple coloration of stems and petioles.

Anatomical changes induced by Al included swelling of root tips, curling and detachment of root caps, disorganization of cells in the root cap and meristem and loss of cell contents of root cap cells. The relative degree of Al injury was greater in the more susceptible Romano cultivar.

X-ray microanalysis revealed that Al was present in nuclei, cytoplasm and cell walls. Ultrastructural evidence suggests that Al is probably accumulated by ionic exchange onto esteric P in the nucleic acids and membrane lipids.

NAIDOO, G.

Mangrove soils of the Beachwood area, Durban.

Soil samples from almost pure *Avicennia marina* (Forsk.) Vierh. and *Bruguiera gymnorhiza* (L.) Lam. stands were characterized for their physical and chemical properties. All soils examined were weakly acidic, high in clay, organic matter, and moisture at saturation. Acidity increased with air drying. The soils were characterized by low bulk densities, moderate exchange acidities and high CEC. The predominant cations were sodium and magnesium. The ratio of sodium and magnesium to exchangeable bases was very high. The soils were low in available phosphorus and soluble sulphate. Generally, *Avicennia* soils were higher in pH, organic matter, CEC, exchangeable bases and lower in clay, exchange acidity and aluminium than *Bruguiera* soils.

NICHOLAS, A.

Some taxonomic considerations when dealing with the genus *Drosera* in the summer rainfall region of Southern Africa.

The Droseraceae of Southern Africa has been adequately dealt with in existing floras of the area. On paper the taxonomy of these plants appears congruent, however examination of herbarium material shows that this is not the case and that the taxonomy is often confusing. Nineteen species of *Drosera* occur in Southern Africa, seven of these in the summer rainfall region. Two major taxonomic problems are discussed in relation to these seven species. It has been suggested that *D. collinsiae* is a hybrid produced by *D. burkeana* and *D. madagascariensis*, data on morphology, distribution and habitat preference are presented in an attempt to resolve this problem. The four species comprising the *burkeana* Complex appear to show continuous variation between one another, and evidence is available to support this view. It is suggested that this continuous variation is the source of much of the taxonomic confusion surrounding the species concerned.

NOEL, A. R. A.

On the Wood Structure of an anomalous *Galium* from Namaqualand.

Galium tomentosum Thb., from arid sites in Namaqualand and S.W. Africa, forms perennial aerial stems with hard brittle wood, although until recently it was described only from herbaceous shoots. Woodiness predominates in the Rubiaceae, but is very rare in the tribe Rubieae and few examples have been studied.

The vessels are diffuse, narrow (72 x 53 µm), short (182 µm), with simple approximately transverse end plates. Pitting is multiseriate, alternate, oval to circular, with narrowly elliptical apertures. Pits are vestured and lumina thinly warded. The vascular tracheids are very narrow (21 µm), with a greater length range (108 – 280 µm), caudate, with biseriate pitting. Libriform fibres, septate fibres and fibre tracheids are absent. Vertical parenchyma is very prominent, terminal and metatracheal. There are no vascular rays.

Such structure is untypical of the Rubiaceae and is considered to represent secondary woodiness in an otherwise herbaceous tribe, possibly a reflection of a specialised habitat.

OWER, J. & TEW, J.

The Effects of Temperature on Equilibration Time and Response of Soil Psychrometers.

Wescor PCT-55-10 soil psychrometers were calibrated within a range of temperatures (15° – 35°C) likely to be encountered in the soil environment. At each temperature, the time taken for equilibration and the e.m.f. response was recorded. The calibration was repeated using a range of solutions varying from 0 to 1 molal. The relationship between the water potential of the calibration solution and psychrometer response as

influenced by equilibration temperature, was thereby determined. Experimental technique and data are discussed in relation to their application in actual, *in situ*, soil psychrometric measurement.

PENDLE, B. G. & BATE, G. C.

Physiological status and transpiration of selected species from the *Burkea* savanna.

Three woody species were investigated during a drying cycle. Rates of transpiration are related to the leaf resistance as measured by diffusion porometry and other appropriate environmental parameters.

Leaf resistance was shown to be a function of water potential, soil-divided into pressure potential, osmotic and matric potentials and light.

The significance of these relationships to the operation of the whole water system is discussed including the differences between the species investigated.

PIENAAR, R. N.

Observations on the Prymnesiophyceae occurring off the East Coast of South Africa.

The Prymnesiophyceae are a class of algae characterised by the presence of a thirrs flagellum-like organelle situated between the two flagella. This organelle is referred to as a haptonema. The cells are usually covered by layers of scales which may be entirely organic or they may possess two types of scales, one of which is organic and the second type has an inorganic component deposited on the organic base plate.

Representations of the Prymnesiophyceae are well represented in in-shore waters occurring off the East Coast of South Africa.

Some of the more unusual species are presented and their distribution along the east coast is discussed. Some information on the methods of scale production in the class will also be presented.

PIENAAR, R. N.

Studies on the development of Antheridia and Archegonia in Ferns.

Selected species of indigenous ferns have been studied with respect to the development of the antheridia and archegonia.

Fern spores are germinated on a nutrient agar and the stages in the development of the gametophytes are monitored. The development of the antheridia and archegonia have been studied at the level of both the light and electron microscope.

Interesting observations on the development of the archegonia with particular respect to the degeneration of the neck canal cells are presented and discussed.

PIENAAR, R. N., SMITH, M. T. & TURNER, J.

Sexual reproduction in the genus *Sargassum*.

The genus *Sargassum* is well represented in tidal pools occurring off the East Coast of South Africa.

A detailed study was undertaken on the development of the eggs and sperm within the conceptacles of *Sargassum cf heterophyllum* at the level of both the light and electron microscope.

The post fertilization changes and the early stages in the development of the young diploid plants has also been investigated.

The results of this developmental study will be presented and discussed.

PIETERSE, A. J. H.

Die identifisering en klassifisering van *Phacotus Perty* (Chlorophyta).

'n Eensellige, werpskyfvormige, geflagelleerde verteenwoordiger van die Chlorophyta (groenalge) is in 'n klein poeletjie naby Roodeplaatdam en in Roodeplaatdam self aangetref. Die alg is op grond van die volgende eienskappe as *Phacotus Perty* (Familie Phacotaceae) geïdentifiseer. Die sel bestaan uit 'n chlamydomonasagtige protoplas wat op so 'n manier in 'n lorika ingesluit is dat 'n ruimte tussen die lorika en protoplas voorkom. Die lorika bestaan uit twee helftes, elk met 'n flagellumporie.

Met behulp van die aftaselektronmikroskoop is vasgestel dat punktuums (knoppies) op die rand van die lorika en skulptuur op die res van die lorika aan kristalle gewyt kan word. Op grond van ligmikroskoop – waarneembare eienskappe is die algsoort as *Phacotus lenticularis* geïdentifiseer.

Met behulp van die aftaselektronmikroskoop is egter vasgestel dat die algsoort ook eienskappe van *P. subglobosus*, *P. lendneri* en *P. australis* naas dié van *P. lenticularis* vertoon.

Afhangend van verdere ondersoek lyk dit asof *P. lenticularis* en *P. lendneri* dieselfde organisme is op grond van die variasie in eienskappe wat by hierdie organisme aangetref is.

PIETERSE, A. J. H. & BRUWER, C. A.

The relationship between Chlorophyll a and inorganic N and P in Roodeplaat Dam: 1976, 1977, 1978.

Roodeplaat Dam is an eutrophic man-made lake situated 20 km from Pretoria. The impoundment is an important recreational site, and its water is being used for potable purposes. Intensive *Microcystis*

aeruginosa, *Anabaena circinalis* and *Melosira granulata* blooms occur in the dam, making the optimal multipurpose utilization of the impoundment impossible

The Pienaars River, one of three inflowing streams, contributes 25% of the total water inflow and 75 and 87% of the annual loading of dissolved nitrogen and phosphorus respectively, resulting, as a consequence of the sinuous shape of the impoundment, in nutrient and phytoplankton gradients occurring from the inflow towards the dam wall.

In relating the annual mean chlorophyll *a* and inorganic N and P concentrations at 6 sampling stations for 1976, 1977 and 1978 it was found that algal growth is primarily limited by inorganic phosphorus. The following statistically significant correlation was found to occur between chlorophyll *a* and PO₄-P for 1977 (retention time 8,5 months):

$$\log \text{Chl } a = 0,72 \log \text{PO}_4\text{-P} + 0,21 \quad n = 6; r = 0,95$$

For 1976 (retention time 4,2 months) and 1978 (retention time 4,6 months) the correlation coefficients were 0,66 and 0,51 respectively indicating the importance of retention time in determining the relationship between phytoplankton and the limiting nutrient.

If relationships like the above are to be used for predictive, planning, and management purposes, water supply rates, i.e. retention time, should be taken into account.

PROPHET, D. V. & BATE, G. C.

The effect of varying concentrations of Nitrate and Phosphate on the relative growth rates and rates of uptake of these ions by *Salvinia molesta* (Mitchell).

Samples of the Kariba weed *Salvinia molesta*, taken from the same clone, were grown at 25°C in a modified Hoagland's solution with nitrate and phosphate concentrations ranging between 0 – 250 ppm N and 0 – 60 ppm P. The rates of abstraction of these ions were measured weekly and were correlated to the relative growth rate. It was found that the rate of abstraction of nitrate from the solution increased with increased concentrations of both nitrate and phosphate. There was a similar trend in the uptake of phosphate. Neither of these results showed that the optimum concentrations of these ions had been reached, indicating that *Salvinia molesta* could be a useful plant for the abstraction of nutrients from sewage and industrial effluents in warm climates.

The high carbon dioxide compensation point (85 ppm) and anatomical studies show that this plant is probably a C³ species as expected from a fern, despite the high photosynthetic rates.

RETIEF, E. & HERMAN, P.

The taxonomic value of seed surface ultrastructure.

The shape and size of seeds may vary considerably within a taxon, but the surface features of seeds are relatively constant. The ultrastructure of seed coat surfaces is sufficiently diverse to furnish an important feature for classification. By using the scanning electron microscope the taxonomically important details of the seed surface, not previously recorded, are revealed. Scanning micrographs provide a rapid and realistic means of illustrating seeds. Seed details tend to be imprecise in taxonomic descriptions – scanning leads to much fuller and more accurate descriptions. A study of the seeds of plants indigenous in Southern Africa is being undertaken in order to learn in which taxa the ultra structure of seed surfaces is of taxonomic value. A data bank of scanning micrographs has been started as part of the seed collection of the National Herbarium, Botanical Research Institute

REY, M. E. C. & GARNETT, H. M.

Epidemiology of fungal diseases on *Panicum maximum* and *Digitaria eriantha* at Nylsvley.

Epidemiology is the science of disease in populations, and is concerned with host-pathogen-environment interactions. Studies on the progress of fungal diseases on the grasses *Panicum maximum* and *Digitaria eriantha* were carried out at Nylsvley. *Puccinia digitariae* (rust) was observed on *Digitaria*, whilst *Phyllachora paspalicola* (tarspot) and eyespot (caused by a member of the Imperfect Fungi) were detected on *Panicum*. All three diseases cause localized necrosis of leaf tissue.

The disease progress curves for rust incidence and severity both exhibited an atypical linear growth rate as the season progressed, which probably indicates that the number of new cases of infection was not dependent on previously established infections. For tarspot, the growth rates of incidence and intensity were found to be exponential. Eyespot appeared late in the season, probably as a secondary invader and the disease progress curves appeared logarithmic, indicating that some factor, probably leaf age or low humidity, had a restrictive influence on relative growth rates.

ROBBERTSE, P. J., VENTER, G. & JANSE VAN RENSBURG, H.

The wood anatomy of the South African *Acacias*.

ABSTRACT

Wood specimens of 37 different *Acacia* species were used for this study. Of all the wood characters investigated, only nine were found to be useful for a principal component analysis to differentiate between

the different species. Of these the width and to a lesser extent, the height of the rays gave the best results. The rays in the wood of the subgenus *Acacia* are 1 – 3 seriate, while those of the subgenus *Aculeiferum* are multiseriata. A significant negative correlation was found between the latitude and ray height of *A. karroo* wood specimens collected in different parts of the country.

ROBERTSON, B. L., CASS, D. D. & PETEYA, D. J.

Cellularization of the barley megagametophyte and its implications for mature organization and function.

Cellularization of the barley embryo sac begins by the 8-nucleate stage and before migration of the polar nuclei. Cellularization at chalazal and micropylar poles of the embryo sac is nearly synchronous. Cellularization occurs by freely-growing walls originating from the embryo sac wall which extend inward and partition region of cytoplasm and nuclei. Mitotic spindles and cell plates are absent during initiation and growth of these walls, clusters of microtubules are associated with their growing ends. Walls surrounding the chalazal cells are continuous and are penetrated by plasmodesmata. Mitoses leading to production of up to 100 antipodal cells in the mature embryo sac occur only after complete cellularization of the 3 initial antipodals. The appearance of morphological differentiation among the 3 micropylar cells is delayed until partitioning is complete. Walls surrounding the micropylar cells are discontinuous, the discontinuities most apparent between one synergid and the egg and between the same synergid and the central cell. Plasmodesmata are not uniformly distributed among the micropylar cells even where walls are present and continuous. Paired membranes form the boundaries among the micropylar cells and central cell where walls are absent. This pattern of micropylar wall discontinuities, established early in megagametogenesis, could represent a pathway for later sperm transfer from a synergid into the egg and central cell.

ROBINSON, E. R.

Some aspects of the ecology and systematics of the genus *Cymbopogon* (Gramineae: Andropogoneae) in southern Africa.

The Southern African taxa of *Cymbopogon* are evaluated in the light of the most recent worldwide revision of the genus. A preliminary conceptual model consistent with the taxonomic treatment and current ecological knowledge of the Southern African species is developed. This is used to generate hypotheses concerning aspects of the evolution of the taxon and these are discussed.

ROGERS, F.

The Epiphyton on *Potamogeton crispus* L.: Changes in Standing Crop and Nitrogen Fixation.

1. *Potamogeton crispus* is an important submerged hydrophyte on the Pongolo floodplain. Maximum standing crop may be as high as 110 g dry mass m⁻².
2. The hydrophyte supports a considerable growth of epiphyton, with biomass ranging between 25 and 75% that of *P. crispus*.
3. Ash-free dry mass comprises 82-88% and 11-22% of the dry mass of *P. crispus* and epiphyton respectively.
4. A species of *Gloeotrichia* present in the epiphyton for part of the year may form up to 10% of the epiphyton biomass.
5. The epiphyton fixes a considerable amount of nitrogen with a peak fixation rate (0.9 mg N per g epiphyton d⁻¹) at maximum standing crop. A total of 1.12 tonnes (1.25 gm⁻²)N was fixed in Tete pan in 1978.
6. The significance of the epiphyton in the functioning of the pan is discussed.

ROGERS, K. H.

Decomposition of *Potamogeton crispus* L.: A comparison of the pattern of particulate matter and nutrient loss from naturally senescing and dried plants.

1. Much of our understanding of decomposition in aquatic systems is based on studies of material which has been dried before experimentation.
2. The loss of dry weight from litter bags containing dried plant material was slower overall than in the case of naturally senescing plants although initial losses were more rapid.
3. A marked loss of nutrients by leaching occurred from dried material but losses from senescing plants were proportional to the rate of dry matter loss, i.e. the reduction in particle size.
4. The response of snails (detritivores) to the dried material was markedly different and 2.5 times as many entered the bags containing senescing plants.
5. Different functions were required to define the two sets of data mathematically.
6. The significance of the results to the understanding of decomposition in freshwaters and to future research priorities is discussed.

ROGERS, K. H., ROGERS, F. E. J. & BREEN, C. M.

***Potamogeton crispus* L. and its epiphyton : their rôle in the functioning of the pans of the Pongolo river floodplain.**

1. The submerged hydrophyte *Potamogeton crispus* L. occurs as a winter producing annual in extensive, often monospecific, stands in the pans of the Pongolo river floodplain. Maximum standing crop (up to 110 g m⁻²) occurs in early spring whereafter the population decreases rapidly.
2. Although turions form the major food source for waterfowl during winter and spring, only 5% of the total turion production is consumed. Grazing may stimulate turion production.
3. Decomposition is extremely rapid with up to 93% of dry weight lost in 22 days. Invertebrates, particularly *Bulinus* snails, are important contributors to this rapid decay rate.
4. *P. crispus* brings large amounts of nutrients into circulation.
5. Colonization of *P. crispus* by epiphyton increases as the plants age but epiphyton standing crop is a function of substrate availability. At maximum standing crop epiphyton biomass may be equivalent to 40% of that of the hydrophyte. The epiphyton may fix up to 1.25 g N m⁻² a⁻¹.

SCHEEPERS, J. C.

Nakor national plan for nature conservation.

The poster is intended to catch the eye and arouse the interest of the onlooker with a view to engaging the presenter in conversation. It is hoped that the assistance of the interested members of the South African botanical fraternity can thereby be enlisted because they can make an invaluable contribution to this project. The poster is intended to provide brief background answers to the following questions : What is NAKOR? What is the NAKOR National Plan for Nature Conservation? Why is it necessary, important and urgent? What progress has been made so far? What remains to be done? What contribution can the botanist make towards realising the objects of the project?

SCHELPE, E. A. C. L. E.

Some aspects of the phytogeography of Southern Hemisphere Pteridophyta.

A number of species and species complexes of Pteridophyta show amph-Atlantic distribution in the Southern Hemisphere. Only a few typical south circumpolar subantarctic species occur in continental Africa. The occurrence of South African taxa on Amsterdam and Kerguelen islands in the southern Indian Ocean seems to have been the result of random, long range wind dispersal of species.

SHAUGHNESSY, G. L.

A Revised History of the Introduction of Australian Acacias on the Cape Flats.

The investigation of the history of Australian acacias on the Cape Flats carried out by Roux (*S. Af. J. Sci.*, 57, 99-102, 1961) has been extended both by examination of additional sources, including manuscripts, and by consideration of the periods 1847—1876 and 1892—1975, which he ignored. A revised history of events, which casts doubt on Roux's conclusions in regard to the critical period of establishment of the acacias and the means of their subsequent spread, is presented.

SIMONS, R. H.

Aspects of Kelp-harvesting on the Cape Peninsula.

South African kelps on the west coast have for long been commercially exploited. The secondary source of the material used was, until the very recent past, the beach where these large marine algae come ashore after being torn from their attachments. The Sea Fisheries Branch has developed certain antagonisms towards this commercial activity and, rather than interfere too drastically in this enterprise is turning its attention to harvesting these algae from the standing stock. Much background information has been gathered through the past six years and the point has been reached where a small scale commercial harvesting programme has been launched. Some of the information relevant to this experiment will be presented.

SIMONS, R. H.

Sea temperatures around Cape Town and marine biology.

Sea temperatures are regarded as of fundamental importance in determining seaweed and marine faunal distributions. Past summaries of the temperature regime in the vicinity of Cape Town indicate a seasonal fluctuation of about 5°C with cooler conditions occurring in winter and warmer waters existing in summer. The Seaweed Unit of the Sea Fisheries Branch has kept detailed records of the actual temperatures experienced continuously over periods of several years and the picture that emerges is very interesting. These findings will be disclosed and related to some biological characteristics of the area.

SMALL, J. G. C. & GARNER, C.

Germination of *Erica junonia*, an endangered species.

Erica junonia seeds are dormant and remain so even after prolonged periods of dry storage.

Of a very wide range of dormancy breaking agents and conditions tested only gibberellic acid and stratification had some dormancy breaking effect. Highest germination was attained when stratification followed a preincubation in gibberellic acid (GA) at a high temperature. GA⁷ was more effective than GA³. The results are discussed in terms of the function of GA during high temperature imbibition and during stratification.

SMITH, D. M. N. & STEWART, J.

Taxonomic studies in the genus *Pachycarpus* (Asclepiadaceae).

Pachycarpus is an African genus of 43 species, 27 of which have been recorded in Southern Africa, south of the Limpopo (Brown, 1908). The species from southern Africa were investigated in the present study and it is concluded that there are only 24 distinct species of *Pachycarpus* south of the Limpopo, including one species that is as yet undescribed.

SMITH, F. R.

Determination of the effects of winter and summer burns on four indigenous shrub species of the Natal Drakensberg.

Information is required concerning the use of fire for the conservation of woody communities in the Natal Drakensberg. Accordingly, field trials were implemented to determine the response of *Buddleia salviifolia* (L.) Lam., *Leucosidea sericea* Eck. & Zeyh., *Philippia evansii* N.E. Br. and *Widdringtonia nodiflora* (L.) Powrie to winter and summer burning.

The survival of individually tagged stems and subsequent shoot production of mature plants were assessed in the first year after burning.

Similarly, to assess post-burn seedling survival and recruitment, individuals present before the burn were marked and new germination was recorded.

Additional burning trials were carried out on known-age potted plants to determine the interaction between plant age, season of burn and survival.

Fire behaviour and intensity were quantified for all burns. A laboratory experiment to monitor the effects of differing heat loads on seed germination is presently being carried out.

SOARES, M. I. & CRESSWELL, C. F.

The Role of Light, Dark, and Selected Inhibitors in assessing the *in vivo* nitrate reductase activity of *Zea mays* L.

The influence of flushing leaf and root tissue with nitrogen gas on the level and rate of nitrite accumulation has been determined, and the importance of completely anaerobic conditions in relation to measured activity is discussed. Nitrite accumulation in leaf tissue in the presence of light and dark conditions has been determined, and the role of light in this process is considered in relation to data obtained in the presence of the photosynthetic inhibitor 3-(3,4-dichlorophenyl) - 1,1 dimethyl urea (DCMU). The influence of the uncoupling agent 2,4 Dinitrophenol on nitrite formation is also considered with respect to experimental data obtained.

SOMMERVILLE, J. E. M.

Fynbos community phenology.

The phenology of six communities has been studied. These represent the four major vegetation types included in the Fynbos Biome: coastal renosterveid, strandveld and coastal and montane fynbos. Individuals of prominent species were labelled according to the frequency of the species. Flowering, fruiting, growth and deciduous activity were recorded at monthly intervals for 14 months. The data are presented as a percentage of labelled individuals and of species exhibiting each activity, each month. The data show a distinct dichotomy between the growth patterns of the three 'shrubland' and the three fynbos communities. The shrub communities exhibit growth peaks during winter and are summer-deciduous. The fynbos communities exhibit a summer growth peak.

SWART, J. P. J.

n Literatuurverwysingstelsel vir Houtanatomie in Suid-Afrika.

Die tempo waarteen Houtanatomiese publikasies verskyn, noodsaak die implementering en die opdatum hou van n gesentraliseerde inligtingstelsel vir Houtanatomie.

n Ondersoek het aangetoon dat Houtanatomiese vakpublikasies in Houtkundige sowel as Plantkundige tydskrifte verskyn en dit bemoeilik literatuursoektogte.

n Bespreking van die toeganklikheid van beskikbare stelsels in Suid-Afrika, en hoe hierdie stelsels geïntegreer kan word, word gegee.

TEW, J. & MABINDISA, E.

Water Utilisation as a Factor in the Distribution of Mangrove Seedlings.

In the Umgazana River estuary different population types in the mangrove community have been identified, which are associated with different positions on the flooding profile. These have been designated for convenience 'river bank (not eroded) stand', 'mature central stand', 'bank edge stand' and old *Avicennia* stand. The interesting feature is the seedling distribution in these different areas, and in particular that of *Avicennia marina* which is dominant in the 'river bank' and 'back edge' stands. Previous preliminary results indicated that *Avicennia marina* seedlings were tolerant of more saline conditions and adapted to withstand a lower mud water potential. On testing this hypothesis all species appear to be adapted to high saline conditions but there appears to be varying sciophytic and heliophytic tolerances in the seedlings. This will be discussed in relation to seedling distribution in the population types identified.

VAN DER WALT, J. J. A. & MARAIS, E. M.

Gedagtes oor die Filogenie van *Pelargonium*.

Pelargonium kan op grond van die sigomorfe blomme, die aanwesigheid van 'n nektarspoor en reduksie van blomdele as die mees gevorderdste genus van die Geraniaceae beskou word. Dit is nog nie duidelik watter seksie(s) van *Pelargonium* die primitiefste is nie, maar 'n evaluering van die kenmerke dui daarop dat die seksies *Hoorea* en *Seymouria* waarskynlik die mees gevorderdste seksies van die genus is. Blomme van hierdie seksies vertoon die hoogste graad van sigomorfie, die grootste reduksie van blomdele, en die mees gevorderde tipe stuifmeelkorrel. Hulle besit 'n geofitiese groeiwyse en is beperk tot die winterreënvalgebied van die Kaapprovinsie.

VENTER, H. J. T.

Die Filogenie van *Monsonia* (Geraniaceae).

Monsonia, 'n kruidagtige plantgenus met wye verspreiding deur Afrika en Suidwes-Asië, is een van vyf genera (*Monsonia*, *Sarcocaulon*, *Geranium*, *Erodium* en *Pelargonium*) wat tans in die Geraniaceae erken word. *Monsonia* is die primitiefste genus in die familie en sover dit intergenereuse verwantskappe betref, toon *Sarcocaulon* soveel ooreenkomst met *Monsonia* dat *Sarcocaulon* weer as seksie teruggeplaas moet word in *Monsonia* soos dit oorspronklik die geval was. Die verskil tussen die twee genera is slegs vegetatief van aard en die parallelle toestand is in *Pelargonium* aan te tref waar daar geen sprake is van 'n verdeling in verskillende genera nie. *Monsonia* bestaan dus uit drie seksies, *Sarcocaulon*, *Plumosae* en *Barbatæ*. Eersgenoemde twee seksies bewoon woestyne en semi-woestyne, terwyl laasgenoemde seksie hoofsaaklik in savanne of grasveld voorkom.

VISSER, J. H.

Synthetic germination stimulants of *Alectra vogeli* seed.

In order to germinate, seed of *Alectra vogelii* Benth., an angiospermous root parasite of leguminous crops, requires a chemical stimulant normally produced by the roots of host plants.

Replacement of the natural stimulant by gibberellic acid, and indole acetic acid in specific ratios, as well as by some aromatic amino acids, lipoic acid and certain analogues of strigol resulted in high germination percentages.

The possible application of these results for the control of this plant by forced germination in the absence of a suitable host is discussed.

VORSTER, P.

Die onderverdeling van die genus *Mariscus* (Fam. Cyperaceae).

Die genus *Mariscus* in die bres sin is taksonomies ondersoek met die doel om dit meer bevredigend te klassifiseer en te omgrens tot op spesievlak. Die eenjarige spesies is in drie afsonderlike genera geplaas, n. *Courtisia*, *Monandrus* en *Pseudolipocarpa*. Die meerjarige spesies is behou in die genus *Mariscus*, en hierdie genus is onderverdeel in vyf subgenera (*Deciduus*, *Thunbergianus*, *Umbellatus*, *Bulbocaulis* en *Tunicatus*), waarvan die subgenus *Umbellatus* verder onderverdeel is in drie seksies, naamlik *Umbellati*, *Latespicæ* en *Laxiglumi*.

By die onderverdeling van *Mariscus* in subgenera en seksies is gevind dat die morfologie van die basiese eenheid van die bloeiwyse (die spicula), en selfs die bloeiwyse as geheel, nie taksonomies bruikbaar is nie, omdat daar binne elke subgenus ontwikkelingsreekses is wat betref die relatiewe gevorderdheid van die bloeiwyses. 'n Meer bruikbare kenmerk, wat 'n meer natuurlike klassifikasie tot gevolg het, is die morfologie van die basale en ondergrondse dele. Hierdie klassifikasie word ondersteun deur ander korrelerende morfologiese kenmerke en deur die anatomie van die organe.

TEW. J. & MABINDISA, E.

Water Utilisation as a Factor in the Distribution of Mangrove Seedlings.

In the Umgazana River estuary different population types in the mangrove community have been identified, which are associated with different positions on the flooding profile. These have been designated for convenience 'river bank (not eroded) stand', 'mature central stand', 'bank edge stand' and old *Avicennia* stand. The interesting feature is the seedling distribution in these different areas, and in particular that of *Avicennia marina* which is dominant in the 'river bank' and 'bank edge' stands. Previous preliminary results indicated that *Avicennia marina* seedlings were tolerant of more saline conditions and adapted to withstand a lower mud water potential. On testing this hypothesis all species appear to be adapted to high saline conditions but there appears to be varying sciophytic and heliophytic tolerances in the seedlings. This will be discussed in relation to seedling distribution in the population types identified.

VAN DER WALT, J. J. A. & MARAIS, E. M.

Gedagtes oor die Filogenie van *Pelargonium*.

Pelargonium kan op grond van die sigomorfe blomme, die aanwesigheid van 'n nektarspoor en reduksie van blomdele as die mees gevorderde genus van die Geraniaceae beskou word. Dit is nog nie duidelik watter seksie(s) van *Pelargonium* die primitiefste is nie, maar 'n evaluering van die kenmerke dui daarop dat die seksies Hoarea en Seymouria waarskynlik die mees gevorderde seksies van die genus is. Blomme van hierdie seksies vertoon die hoogste graad van sigomorfie, die grootste reduksie van blomdele, en die mees gevorderde tipe stuifmeelkorrel. Hulle besit 'n geofitiese groeiwyse en is beperk tot die winterreënvalgebied van die Kaapprovinsie.

VENTER, H. J. T.

Die Filogenie van *Monsonia* (Geraniaceae).

Monsonia, 'n kruidagtige plantgenus met wye verspreiding deur Afrika en Suidwes-Asië, is een van vyf genera (*Monsonia*, *Sarcocaulon*, *Geranium*, *Erodium* en *Pelargonium*) wat tans in die Geraniaceae erken word. *Monsonia* is die primitiefste genus in die familie en sover dit intergeneriese verwantskappe betref, toon *Sarcocaulon* soveel ooreenkoms met *Monsonia* dat *Sarcocaulon* weer as seksie teruggeplaas moet word in *Monsonia* soos dit oorspronklik die geval was. Die verskil tussen die twee genera is slegs vegetatief van aard en die parallelle toestand is in *Pelargonium* aan te tref waar daar geen sprake is van 'n verdeling in verskillende genera nie. *Monsonia* bestaan dus uit drie seksies, *Sarcocaulon*, *Plumosae* en *Barbatæ*. Eersgenoemde twee seksies bewoon woestyne en semi-woestyne, terwyl laasgenoemde seksie hoofsaaklik in savanne of grasveld voorkom.

VISSER, J. H.

Synthetic germination stimulants of *Alectra vogelii* seed.

In order to germinate, seed of *Alectra vogelii* Benth., an angiospermous root parasite of leguminous crops, requires a chemical stimulant normally produced by the roots of host plants.

Replacement of the natural stimulant by gibberellic acid, and indole acetic acid in specific ratios, as well as by some aromatic amino acids, lipoic acid and certain analogues of strigol resulted in high germination percentages.

The possible application of these results for the control of this plant by forced germination in the absence of a suitable host is discussed.

VORSTER, P.

Die onderverdeling van die genus *Mariscus* (Fam. Cyperaceae).

Die genus *Mariscus* in die breet sin is taksonomies ondersoek met die doel om dit meer bevredigend te klassifiseer en te omgrens tot op spesievlak. Die eenjarige spesies is in drie afsonderlike genera geplaas, nl. *Courtoisia*, *Monandrus* en *Pseudolipocarpa*. Die meerjarige spesies is behou in die genus *Mariscus*, en hierdie genus is onderverdeel in vyf subgenera (*Deciduus*, *Thunbergianus*, *Umbellatus*, *Bulbocaulis* en *Tunicatus*) waarvan die subgenus *Umbellatus* verder onderverdeel is in drie seksies, naamlik *Umbellati*, *Latespicatae* en *Laxiglumi*.

By die onderverdeling van *Mariscus* in subgenera en seksies is gevind dat die morfologie van die basiese eenheid van die bloeiwyse (die spicula), en selfs die bloeiwyse as geheel, nie taksonomies bruikbaar is nie, omdat daar binne elke subgenus ontwikkelingsreeks is wat betref die relatiewe gevorderdheid van die bloeiwyses. 'n Meer bruikbare kenmerk, wat 'n meer natuurlike klassifikasie tot gevolg het, is die morfologie van die basale en ondergrondse dele. Hierdie klassifikasie word ondersteun deur ander korrelerende morfologiese kenmerke en deur die anatomie van die organe.

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