

# FORUM BOTANICUM

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

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FIRST ANNUAL CONGRESS: From the 22nd to the 25th of January, 1975 S.A.A.B. held its very successful first annual Congress in Pretoria. This was attended by about 110 members and a few non-members. The venue for the congress was the Boukonde building of the University of Pretoria.

The first two days of the congress were devoted to excursions. On the first day about 70 bright and eager botanists were taken to the Rustenburg Nature Reserve via the Hartebeespoort Dam. The first stop was made at the dam wall where we could view the highly enriched water of this dam after being briefed by Mr. R.D. Wolmsley of the National Institute of Water Research. On the way to the Nature Reserve, the excursion leader, Dr. G.K. Theron (University of Pretoria) gave interesting information on the geology and ecology of the surrounding bushveld region. Our guide in the Nature Reserve was Mr. B.J. Coetzee (Botanical Research Institute) who had done the research for his M.Sc. degree in this reserve. After a sumptuous lunch in the garden of Mr. J. de Klerk, Reserve Superintendent, Mr. L. Oates of the Transvaal Department of Nature Conservation, gave an outline of the work done in the reserve and the future plans for its extension and development. In the afternoon we ventured further into the reserve and were lucky to see the endemic *Frithia pulchra* (Mesembryanthemaceae) in flower. Other species in flower were *Protea caffra* and *P. gagedii* which enchanted Protea enthusiasts like Dr. John Rourke. Foreign botanists, i.e. from outside the Transvaal, were astonished by the rich harvest of wild edible fruits such as "stamvrugte" (*Bequaertiaendron magaliesmontanum*) and wild peaches (*Lindolphia capensis*), now known collectively as "fruit salad".

On the second day the excursion was to the Johannesburg mine dumps, with excursion leaders, Mr. R. Ellis (Botanical Research Institute) and Miss. F. Thatcher (Witwatersrand University). They were assisted by Dr. R. Lubke (Rhodes University) and Messrs. W.H. Cook and J.E. Groves (Chamber of Mines Vegetation Unit). The emphasis was on economic botany. (Or can it perhaps be called industrial botany,) Everybody was surprised to see how dense the vegetation cover on the slopes of a mine dump could be after treatment of only one year. Lunch was had in the shade

of trees on the top of a mine dump. Botanists who had been on previous congress excursions will be interested to hear that, despite bad roads, especially in the Rustenburg Nature Reserve, the buses never gave any trouble!

On Friday, the 24th of January, the congress was officially opened by the honourable Minister of Water Affairs and Forestry, Mr. S.P. Botha who, once again, gave proof of his love of and concern for the rich natural heritage of South Africa. The greater part of this day was devoted to the Symposium - Botany in South Africa, Quo Vadis? A fuller report on this symposium and particularly the resolutions taken, will appear in a later issue of Forum.

The annual general meeting of S.A.A.B. was held in the afternoon when it was announced that next year's congress will be held in Cape Town. The guest speaker at the buffet supper on Friday evening was the Secretary of the Department of Agricultural Technical Services, Dr. W.A. Verbeek, who announced the formation of an Advisory Committee on Botanical Matters, chaired by Dr. B. de Winter. Saturday, the last day of the congress, was devoted to the twenty research papers, dealing with almost all aspects of botany. It was quite fascinating to see the ingenious methods used to force speakers to keep to the 15 minute time limit!

Throughout the congress, there was ample time for those attending to meet new friends and renew old friendships. At the social gatherings, namely the cheese and wine reception, buffet supper and lunch given by the University of Pretoria, many Cape botanists were impressed by the large quantity of good red wines in the Transvaal!

The committee of the Northern Transvaal Section of S.A.A.B. must be congratulated on their excellent organization of our first congress. The members concerned were Dr. N.P. Ferreira (chairman), Miss E. Retief (secretary), Miss I. von Teichmann (treasurer) and Mr. R.P. Ellis, Dr. G.K. Theron, Prof. J.M. Geerthsen and Dr. J.H. Visser. They were assisted by Council Members Dr. B. de Winter, Dr. D. Edwards, Dr. A. Eicker, Prof. N. Grobbelaar and Prof. H.P. v.d. Schijff.

OPSOMMINGS VAN REFERATE - ABSTRACTS OF PAPERS:

1. Anderson, H.M. B.P.I. Palaeontology, Witwatersrand University.

The Cycadophyta of South Africa: fossil and extant.

Summary: The Cycadophyta represented in the fossil record of South Africa (Permian to Cretaceous) were discussed. These consist mainly of leaf remains which in the absence of reproductive structures are difficult to classify.

Particular reference was made to the Molteno Formation (Triassic) where some 20 leaf species occur. The extant genera *Stangeria* and *Encephalartos* were compared to the fossil forms and speciation were briefly discussed with reference to frond shape and distribution in South Africa.

2. Brix, Dr. K.M.F.B. - Department Genetics, University of the Orange Free State. The influence of daylength on the orientation of ovules of *Eragrostis curvula* var. Kromdraai.

Summary: For the study of embryo sac development in *Eragrostis curvula* var. Kromdraai ears were fixed during summertime and their ovaries were dissected out. Cytological investigations showed that all ovules had a hemitropous orientation. To study the influence of the daylength on the embryo sac development the same plants received only six hours of daylight. Cytological investigation showed that the orientation of the ovules had altered: Although some of them were still hemitropous as under summerday conditions, other, from the same ear, showed an orthotropous orientation.

3. De Swardt, Prof. G.H. en Burger, L. - Departement Plantkunde, Randese Afrikaanse Universiteit. Sekere verouderingsaspekte en preservering van angeliere.

Opsomming : Talryke biochemiese veranderinge vind in sellulêre verbinding in die kroonblare van verouderende angeliere plaas. Blomme vir afsonderlike analises is volgens die respiratoriese gedrag, gebaseer op die klimakterium, geselekteer. Kwantitatiewe bepalinge van die totale oplosbare proteïene, vrye aminosure en reduserende suikers is uitgevoer. Die vasstelling van kritiese fases tydens die na-oesleeftyd het gelei tot die ontwikkeling van doeltreffende preserveermiddels. Suksesvolle aanwending van laasgenoemde is alleenlik moontlik indien die blomme op 'n optimale fisiologiese stadium gepluk word en verval van weefsels wat nog beperkend van aard is.

4. Dieckmann, G.S. - Seaweed Research Lab., c/o Botany Department, University of Cape Town. Linear growth and biomass turnover in *Laminaria pallida*.

Summary: Large kelps of South African coastal waters contribute extensively to raw organic material in the sea. Linear growth rates and tissue losses were determined over different periods ranging from 25 to 90 days. It was found that although the stipe grew slowly, the fronds behaved like moving belts of tissue, lost tissue being replaced by new growth. It is quite possible that a whole new frond is produced twice a year. An attempt was made to correlate linear growth with actual biomass turnover. Some studies on the population density of *Laminaria pallida* have been made.

5. Ferreira, S. en Theron, Dr. G.K. - Departement Algemene Plantkunde, Universiteit van Pretoria. Morfologiese verskille by *Encephalartos eugene-maraisii* Verdoorn en die moontlike taksonomiese implikasies daarvan.

Opsomming: *Encephalartos eugene-maraisii* kom in die Waterberge, Wolkberge en die Olifantsriviervallei en by Mica voor. Uitwendige vegetatiewe en generatiewe morfologiese verskille asook anatomiese verskille in die blaarstele is by plante afkomstig vanaf die verskillende lokaliteite waargeneem. Deur middel van Hoofkomponente-analise en Groep (cluster)-analise is vasgestel dat daar moontlik regverdiging bestaan om die plante afkomstig van die verskillende lokaliteite as afsonderlike taksa te beskou.

6. Groenewald, E.G. en Visser, Dr. J.H. - Departement Plantfisiologie, Universiteit van Pretoria. Invloed van prostaglandiene op blomvorming by geïsoleerde groeipunte van *Pharbitis nil*.

Opsomming: Geïsoleerde groeipunte van *Pharbitis*-saailinge was op agar wat minerale elemente, sekere vitamienes en sukrose bevat het, in proefbuise gekweek. Verskillende prostaglandiene was toegedien aan die agar waarop die groeipunte gekweek was. Die invloed van die toegediende prostaglandiene op blomvorming van geïsoleerde groeipunte wat onder nie-induktiewe toestande gehou was, is bespreek.

7. Lubke, Dr. R.A., Clinning, C. and Smith F. - Department of Botany, University of the Witwatersrand. Pattern analysis of some woody species of the Nylsvlei savannah ecosystem project area.

Summary: Five areas of the *Burkea/Ochna* woodland have been selected for intensive plant ecological study. Within each of these areas the structural data of the woody species has been analysed, and using the density of the species in 5m<sup>2</sup> quadrats the pattern of the plants in the area determined. Results for the most important species were presented and possible reasons for the detected patterns are discussed.

8. Moll, Dr. E.J. and Campbell, B.M. - Botany Department, University of Cape Town. Species area determinations for semi-detailed vegetation surveys in the South-Western Cape.

Summary: A method for determining the minimum sample size, to obtain a representative statement of the vegetation in the South-Western Cape, was discussed. Suggested standardized sample sizes for future surveys at a scale of 1:50 000 were given. These suggested sizes were related to the information required from the survey; which is dependent upon the floristic richness, the structure of the vegetation and the time available.

9. Müller, M.A.N., Kok, P.D.F. en Robbertse, Prof. P.J. - Departement Algemene Plantkunde, Universiteit van Pretoria. Afwykende sekondêre diktegroei by *Eriocephalus* L.

Opsomming: 'n Baie interessante geval van afwykende sekondêre diktegroei is by die genus *Eriocephalus* L. waargeneem. Namate die stingel ouer word, vind aanvanklik normale sekondêre diktegroei plaas, waarna die kambium, moontlik weens een of ander fisiologiese rede, in sekere segmente in 'n onaktiewe fase oorgaan. Intussen gaan die sekondêre diktegroei in die aktiewe kambiumsegmente voort, sodat die stingel 'n gegroefde voorkoms aanneem. Die kambium van die lobbe kan op dieselfde wyse in onaktiwiteit verval sodat die stingel 'n erg gelobte voorkoms aanneem. Gegaardgaande met die afwykende sekondêre diktegroei vind ook die afsnoering van die basale sytakke plaas. Die afsnoering en die gegaardgaande afwykende sekondêre diktegroei het tot gevolg dat opsplitsing van die stingel tot in die wortels plaasvind en die moederplant opbreek in 'n aantal selfstandig funksionerende dogterplante wat op hul beurt weer die hele proses kan herhaal totdat 'n kloon ontstaan.

10. Reyneke, W.F. en van der Schijff, Prof. H.P. - Departement Algemene Plantkunde, Universiteit van Pretoria. Blaarontwikkeling by *Cussonia spicata* Thunb.

Opsomming: Die ontwikkeling van die dubbelhandvormig saamgestelde blaar van *Cussonia spicata* is nagegaan en stem in hooftrekke ooreen met die ontwikkeling van 'n veervormig saamgestelde blaar. By *Cussonia spicata* egter word apikale groei van die blaarassie vroeg onderdruk met die gevolg dat die blaartjies in feitlik een vlak ontstaan en dus handvormig vanaf die gedronge ragis uitstraal.

11. Roberts, Prof. B.R. and Anderson, E.R. - Department of Pasture Science, University of the Orange Free State. Methodology for quantitative assessment of the condition and stability of natural grazing lands.

Summary: The need for objective standards for assessment of the condition of natural grazing land was explained. The criteria of botanical composition, basal cover, vigour and soil surface condition were examined and evaluated. Local examples of the documentation of quantitative data in field surveys in various veld types were quoted as illustrations of species rating and condition evaluation. The progress with the development of veld condition scoresheets was sketched and proposals made for application by local ecologists. The application of the principles of plant succession and the use of ecological "benchmark sites" were demonstrated on the basis of Queensland and Orange Free State examples. The paper was illustrated with colour slides.

12. Robertson, B.L. - Department of Botany, University of Port Elizabeth. Notes on the embryology of *Jubaopsis caffra* Becc.

Summary: *Jubaeopsis caffra* Becc. the Republic's only endemic palm, has never been embryologically investigated. This study included sporogenesis and gametogenesis of both sexes and the embryogeny.

Anther wall development is of the Basic Type while cytokinesis during microsporogenesis is simultaneous. The mature microspore is 2-nucleate. Division of the generative nucleus in the pollen tube was observed. The vegetative nucleus, which becomes disorganized, moves into the pollen tube where it remains visible until after formation of the male gametes.

The crassinucellate ovule is bitegmic with a nucellar podium evident in the mature embryo sac. Megasporogenesis was followed from the archesporial cell to the functional chalazal megaspore of a megaspore tetrad. The monosporic female gametophyte is of the Polygonum Type.

Endosperm is initially free-nuclear.

Embryogenesis, embryotectonics and embryogeny were investigated. The embryonomy of *J. caffra* is a modification of the Muscari Variation of Asterad Type. A recapitulatory table for the first four generations was presented.

13. Rutherford, M.C. - Botanical Research Institute, Pretoria. Factors governing the choice between destructive and non-destructive methods for measuring productivity of woody plants in the field.

Summary: Destructive and non-destructive methods for measuring productivity of woody plants in the field were shown not to be equivalent alternatives. The choice between the two basic method types was shown to be determined by the integration of factors such as variation within vegetation; average size of individuals; average growth rate of individuals; the time interval selected and the productivity concept and unit used.

14. Seagrief, Prof. S.C. - Botany Department, Rhodes University. Sand Dune reclamation at Sea Vista.

Summary: Reclamation of a large area of unconsolidated sand dune has been commenced recently at Sea Vista by Leighton Hulett (Pty), Ltd. Initially, the dune was somewhat smoothed over by a bulldozer and then fynbos (previously cut and baled from neighbouring meadows) was spread out evenly over the dune surface. The fynbos is fixed at intervals by wire strands. Branches of "Rooikrans" (*Acacia cyclops*) are placed at intervals to help stabilise the surface litter as well as providing a reservoir of seeds. Stages in the establishment of seedlings of indigenous and exotic species are being monitored and recorded.

15. Smith, V.R. - Institute for Environmental Sciences, University of the Free State. Nutrient status of Marion Island vegetation.

Summary: Marion Island is considered to possess a tundra-type biome and the vegetation of the island consists of a mosaic of herbfield, mire and fjaeldmark, all consisting of low-growing shrubs, graminoids and many Bryophytes. The nutrient (Ca, Mg, Na, K, Fe, N, P) content of the plant species within each community was presented, as was the total nutrient status of the island's vegetation communities, based upon the maximum vegetation standing crop achieved during the growing season. The dependence of some plant species and vegetation communities on the manuring influences of sea-birds and mammals was demonstrated. A brief comparison was made of the average standing crop and nutrient status of the island's lowland plant communities with that of other tundra-type vegetations.

16. Tew, J. and Cresswell, Prof. C.F. - Department of Botany, University of the Witwatersrand. The influence of nitrogen supply on the carbon dioxide compensation point, the net photosynthetic rates and the enzymes associated with carbon dioxide exchange in selected C-4 plants.

Summary: An increase of the nitrogen supply to the roots of four selected C-4 grasses resulted in the induction of an oxygen sensitive carbon dioxide compensation point. The effect of ammonium nitrogen was greater than nitrate nitrogen. The net photosynthetic rates were decreased in the presence of ammonium nitrogen and exhibited a pronounced oxygen sensitivity but were not markedly effected with an increase of the nitrogen supply. The activity of the carboxylating enzyme PEPC was increased with increasing nitrogen supply as nitrate or ammonia while the activity of the secondary carboxylating enzyme RuDPC was unaffected. The photo-respiratory enzyme RuDP oxygenase and glycollate oxidase both showed an increase in activity with increasing nitrogen.

The net photosynthetic rate would appear to be controlled by the ratio of the activity of RuDPC to RuDP oxygenase as the activity of PEPC is not correlated with the photosynthetic rates measured.

A good correlation of the number of microbodies in the bundle sheath cells of *Zea mays* with varying concentration and forms of nitrogen supplied was also found.

17. Van de Venter, Dr. H.A. - Department of Botany, University of Port Elizabeth. Sexual reproduction of *Strelitzia reginae*: Anatomical studies.

Summary: A study of the sexual reproduction of *S. reginae* has revealed that although this species has many features in common with most other angiosperms, some less common features are also found. Three types of disposition are found in the microspore tetrads while the pollen grains formed from these spores are mononucleate. The ovule of *S. reginae* is anatropous and has two integuments. The ovule is crassinucellate and the embryo sac is of the Polygonum type.

A study was also conducted on certain aspects of embryogenesis and on the anatomy of the mature and germinating embryo.

18. Van Wyk, Prof. J.J.P. - Department of Botany, University of Potchefstroom. Vegetation cover of slopes along national roads.

Summary: A study is being conducted to determine the most successful method of covering the soil slopes along newly built national roads, mainly in the Transvaal and Natal. Slides were shown to illustrate the work done with several plant species under varying conditions.

19. Venter, P. and Anderson, J.M. - B.P.I. Palaeontology, University of the Witwatersrand. The distribution and ecology of the trees and woody shrubs of the Transvaal.

Summary: The paper consisted of a preliminary report of the results gathered to date and of the scope and aims of the project. Approximately 1 000 species of indigenous trees and woody shrubs occur in the Transvaal (+ Swaziland). The detailed distribution and relative abundance of each species is being plotted on separate maps (trace) of the Transvaal (scale: 1:2 million). An inset of Africa at larger scale indicates the more general distribution. Separate underlays of the various parameters controlling distribution, eg. geology, soils topography, various aspects of rainfall and temperature have been prepared. When the trace map for any particular species is superimposed on the underlay maps the combination of factors controlling the distribution of the species can be ascertained.

20. Weisser, Dr. P., Weisser, J. and Robies, L. - Botanical Research Institute, Pretoria. Contribution to the autecology of a subterranean *Neochilenia* sp. (*Cactaceae*) in the Atacama Desert.

Summary: A population of subterranean cactus receiving light through the overlying translucent sand layer (0,5 - 2,0 cm thick) was discovered in the locality of Cifuncho. The flowering and fructification occur above surface and the fruits are wind dispersed. Cultivation has proved to be difficult. On a 25 m<sup>2</sup> area studied, the population density was of 1 plant per 1 m<sup>2</sup>. A description of this cactus was given and the problems of adaptation to this peculiar environment discussed.

VICTOR S. SUMMERHAYES died in England on 27 December last year at the age of 77. For 39 years, from 1925-64, he was in charge of the orchid herbarium at Kew and made outstanding contributions to orchid taxonomy particularly from Africa.

BOLUS HERBARIUM, UNIVERSITY OF CAPE TOWN: Hellmuth R. Tölken has been awarded the Ph.D. degree for his studies on the Genus *Crassula* and Hugh F. Glen has been awarded the M.Sc. degree with distinction for his thesis on the



*Gibbaeinae* (Mesembryanthemaceae). Dr. Tölken is on the staff of the Botanical Research Institute and<sup>is</sup> at present Liaison Officer at Kew. Mr. Glen is temporarily on the staff of the Botany Department and Bolus Herbarium.

POSTS VACANT:

(1) Botanical Research Institute

a) Ethno-botanist (professional office or technician).

We need someone who will work well together with archaeologists, ethnologists and other researchers, to collect plants and data about plants used by primitive peoples. The person appointed will make surveys of research areas to determine the plant resources available, and will also co-ordinate identification, preservation and maintenance of specimens collected during these studies, and build up photographic and information records, etc.

b) Plant Exploration Officers. Several posts exist for professional officers and technicians in the plant exploration unit. This work involves exploration for a wide range of economic plant potentials: horticultural to medicinal. Two posts are specifically for the investigation of plants active against cancer - part of an international programme to control this disease.

Appointees to these posts will spend up to 1/3 of their time in the field, and will travel widely within the country. Minimum qualifications for technicians are B.Sc. with botany as a major or the departmental technicians diploma. For all these posts salaries will depend on qualifications and experience.

Applications should be made on Z.83 forms, obtainable from any Government Department.

Further details can be obtained from Mr. M. Wells or Dr. B. de Winter at the B.R.I., phone: Pretoria 766635, 765580 or 764946.

(2) Department of Nature Conservation in Cape Province

Two vacant professional posts for botanists in the Department. One post is located in the Northern Cape, the other in the Western Cape.

There is also a vacancy for a Senior Superintendent of Gardens (NTC III or Diploma in Horticulture) at the Hester Malan Nature Reserve, Springbok, Namaqualand.

For information about these posts contact The Director of Nature Conservation,

P.O. Box 659, Cape Town, 8000.

NEW MEMBERS:

Mev. C.E. Labuschagne, Boundarylaan 1300, Hatfield, Pretoria, 0002.

Miss F.M. Thatcher, 15 Ennis Road, Parkview, Johannesburg, 2001.

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KIRSTENBOSCH JUBILEE FELLOWSHIP (BOTANY OR HORTICULTURE):

The object of the Fellowship of R1 000 which will be awarded annually, is to enable a qualified person to undertake his or her study and/or research in any branch of botany or horticulture pertaining to the indigenous flora of South Africa.

Selections to the Fellowship are to be made by the Trustees of the National Botanic Gardens of South Africa after due advertisement in the Republic and in such countries as the Trustees may determine.

Payment of any award which has not been paid out one year after being awarded, will be considered upon receipt of a further written application.

The closing date is 30 March, 1975.

The prescribed application form is obtainable from:

The Director  
National Botanic Gardens of South Africa  
Kirstenbosch  
NEWLANDS  
7700.

Tel. Cape Town 77-1166 (Miss Olivier)