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NEWS-LETTER OF THE SOUTH AFRICAN ASSOCIATION OF BOTANISTS
NUUSRIEF VAN DIE SUID-AFRIKAANSE GENOOTSKAP VAN PLANTKUNDIGES

SOUTH AFRICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE:-

The annual congress of the South African Association for the Advancement of Science was held in Cape Town from 29th June to 4th July, 1970.

The Congress Programme was very full with a symposium on "Water for Progress" in keeping with the National Water Year. There were a few papers of purely botanical interest in the symposium particularly those by Dr B.J. Chohnoky on biological life in water and Prof. C.L. Wicht on the influence of vegetation in South African catchments on water supplies. These two papers will be published with all the other water symposium papers in a supplement to the South African Journal of Science.

Prof. N. Grobbelaar (Dept. van Plantfisiologie en -biochemie, Universiteit van Pretoria) se presidentsrede het gegaan oor "Biologiese stikstofbinding" en het 'n goeie oersig verskaf van alle aspekte van biologiese stikstofbinding. Daar was ook interessante verwysings na stikstofbinding deur nie-peulplante.

Section B had a very full programme which started with a most erudite lecture by Dr R. Melville of Kew on general principles of leaf evolution. The Turing Diffusion-reaction theory of morphogenesis explains how the spacing of lateral veins in a pinnately veined leaf is determined at the initial.

Mr J.C. Scheepers (Botanical Research Institute) discussed a few ideas on inter-disciplinary co-ordination in view of the alarming specialisation and fragmentation especially in the ecological field.

Dr A. Jacot Guillarmod (Dept. of Botany and Microbiology, Rhodes University) discussed some potentially dangerous aquatic weeds and her paper evoked a lot of interest. Mr G.K. Theron (Dept. van Algemene Plantkunde, Universiteit van Pretoria) het vertel van veral die

verspreiding van Protea caffra in die Loskopdam-natuurreservaat. Mnr H.J. Venter het uitstekende skyfies gebruik om die plantegroei van Richardsbaai te illustreer.

Mr H.R. Tölken (Botany Department, University of Cape Town) delivered two papers. One dealt with a Crassula species complex with which he is involved for his Ph.D. thesis. Mr Tölken's second paper dealt with the floral morphology of Boscia and Maerua. Serial sections have revealed that the floral tube is not a receptacle tube but rather a fusion of the disc and the hypanthium below the ovary. The anatomy reveals close relationship between the two genera.

Algal taxonomy does not often have a forum and Dr S.C. Seagrieffs (Dept. of Botany and Microbiology, Rhodes University) paper on morphology and reproduction of Calliblepharis fimbriata (Ag.) Kuetz. was presented in a most stimulating way with excellent slides.

Prof. O.A. Lewis (University College, Durban) discussed work on Datura stramonium which revealed that as well as the leaves the pericarp contributes various amino acids to the seed. Cl₄ was used.

Dr R.A. Lubke (Botany Department, University of the Witwatersrand) discussed the taxonomy of the grass genus Loudetia and the numerical taxonomic studies that had been done on it.

Mr J.U. Grobbelaar (Botany Dept., University of the Orange Free State) discussed continuous culture methods in algae. Dr J.N. Eloff (Dept. van Plantkunde, Universiteit van die O.V.S.) het vertel van isoleering van hipoglisien A uit Billia hippocastanum saad.

Mr T.T. Barnard unravelled the historical intrigue behind the correct name for the type of Spiloxene aquatica. Many botanists and physiologists were duely amazed at this "unknown" field of historical botanical complexity.

Dr F. Getliffe (University College, Durban) gave an excellent paper on her work on the chemical characters and taxonomic limits of the genus Satureja.

POST CONGRESS BOTANICAL TOUR:-

The South Western Cape Section of the S.A.A.B. organised a tour of the S.W. Cape, which took place immediately after the completion of the S2A3 Congress.

The idea of this tour was originally put forward by Mrs Enid du Plessis and she was ably assisted by various members of the S.W. Cape Section in planning and preparing for it.

As this was the first time that a tour of this nature had been organised one might have expected some problems and difficulties to arise, but if these did arise they were all solved before the tour took place.

A pre-tour survey of the area had been carried out, and as a result we were furnished with maps indicating the entire trip with each stop marked, and with lists of the plants growing in the area of each stop. On the journey Mr Teddie Oliver, sitting in the front of the bus, was provided with a microphone to point out the vegetation, and Professor Schelpe, sitting at the back, was able to give us further information if we required it. Mr Hugh Taylor also joined the party in the areas which he had studied, such as the Marloth reserve at Swellendam.

We travelled in a leisurely fashion with many unhurried stops which allowed us to get out of the bus and delve amongst the plants ourselves. Having a permit to collect specimens was an added pleasure.

In addition to the well-prepared schedules of each day's travel large demonstration sheets of pressed and named specimens for each stop had been prepared by the Compton Herbarium. Reference books and a microscope were also provided. Unfortunately there just was not enough time to make full use of all this information, or perhaps it was that botanists are also human. After arrival at our hotel each evening, having put the collection of the day away in presses and packets, the temptation was to relax in the lounge instead of studying the named specimens. On the other hand this did provide an opportunity to have useful discussions with various members of the party.

Each day held its own particular interest and what a pleasure it was to travel in the company of so many well-informed botanists. The entire trip went smoothly and we must thank all those concerned for the great deal of work put into the preparatipn of the tour, particularly must we thank Mrs du Plessis for her organisation, and who, also, even though she could not herself come on the tour, personally prepared our first luncheon.

The only factor which the organisers were not able to control was the weather, and even though it was cloudy and

we had some rain, this did not spoil the tour. In spite of the light values being almost nil at times, many of us came back with some excellent photographs.

A brief summary will give an idea of the country that we saw. On the first day we left Cape Town going via the Cape Flats, Rooi Els River mouth and Betty's Bay to Hermanus. We left Hermanus on the second day to go past Strandskloof, on to Elim, then down to Cape Agulhas spending the night at Bredasdorp. The next day took us to the De Hoop provincial farm with its beautiful vlei and interesting vegetation, then on to the Marloth Reserve at Swellendam. After a brief visit to the Drosty Museum at Swellendam on the fourth day, we went through the "Robertson Karoo" to Worcester. Mr Frank Stayner of the Worcester Karoo Gardens acted as our guide in this area. After lunching at Brandvlei we returned to Cape Town via the Fransch Hoek Pass.

As this tour was so successful, it is to be hoped that other centres will plan similar excursions in the future.

L.E. Davidson

RICHTERSVELD:-

Mr W. Wisura (Kirstenbosch) and Mr H. Tölken (University of Cape Town) recently returned from an unusual expedition crossing the Richtersveld (area between Vioolsdrif and Alexander Bay) from the east to the west. It is striking to find Schotia afra (L.) Bodin var. angustifolia (E. Mey.) Harv. growing in dry river beds along the Orange River. According to Codd (1956) in Bothalia 6, this variety has the peculiar distribution from the eastern Cape to the north-western Cape with few localities in between along the Orange River. Similarly, and even more disjunct, is the distribution of Bowiea volubilis Harv. which is recorded in South Africa from the Richtersveld, Eastern Cape, Natal and Transvaal. It is found in shady places among boulders near the Orange River.

As one travels from the east to the west it becomes evident that a distinct barrier for plant distribution occurs along the more or less continuous mountain ranges from about Witpütz (S.W.A.) in the north to Lekkersing in the south. It is interesting, however, that the mountains themselves do not seem to be the unsurmountable barrier but rather the effect they have on the mist which in turn

has a great influence on the plant distribution. For instance, many of the plants that are found on the western slopes of the Hellskloof also occur on top of the mountain and become less and less frequent on the eastern slopes and the actual barrier or no-man's-land lies about along the Kanakouriep River, or Deurloop River on more recent maps. As examples of the more obvious plants one might take the frequent occurrence of Boscia albitrunca, B. foetida and Maerua schinzii which often even grow next to one another. In the west of the Kanakouriep River only Boscia albitrunca occurs rather sporadically. Even more pronounced is the difference in Cotyledon orbicularis of which the broad-leafed form occurs in the east whereas in the west one finds the form with almost terete leaves.

Many different succulents were collected on this expedition. The main aim was to get some insight into the variation and distribution of some of the succulents in that area.

BOTANY DEPARTMENT, UNIVERSITY OF THE WITWATERSRAND:-

Professor C.F. Cresswell has just returned to the Department after spending twelve months in the United States. In August last year he was invited to attend an International Symposium on "The revegetation of drastically disturbed areas" held at the State College, Pennsylvania, and gave a paper on the work done by the Department on the revegetation of the Witwatersrand mine dumps. He also attended the International Botanical Congress in Seattle in September. From September until July this year, Professor Cresswell was working in Prof. Harry Beever's laboratory at the University of California, Santa Cruz campus, on the isolation of glyoxysomes from higher plants and algae, and investigating the enzyme complement of the organelles from different sources. During his stay in Santa Cruz he was able to participate regularly in the Plant Physiology seminars held at the Carnegie Institute at Stanford University, and also participate in visits to Dr Fritz Wentz, Desert Field Research Station in Death Valley, and a number of departments on the West Coast.

One of his Ph.D. students, Mrs Nelson, has practically completed work on the effect heavy metals have on the germination, growth and development of Themeda triandra Forsk. He is continuing his investigation into Organic Acid metabolism of succulent and non-succulent species.

At present a study is being made by two M.Sc. students in this field (1) Mr W. Lindner into the carbon dioxide fixation systems in the light and the dark, (2) Mr P. Fair is investigating the light fixation of CO₂ and photorespiration systems in some highveld grasses.

Professor Florence D. Hancock (cryptogamic botanist) has been acting head of the department during Professor Cresswell's absence, and hopes to have certain research work completed soon; viz.: A guide to the pteridophytes of the Witwatersrand, this in collaboration with three of her past students - Mrs A. Lucas, Mrs B. Pike and Mrs P. Edkins; the diatom associations of Lake Kariba; the fresh water diatom associations of the island of Inhaca and, in conjunction with Professor Cresswell, studies of developing associations of algae, bryophytes and pteridophytes on the revegetation of mine dumps of the Witwatersrand. Messrs King, Macdonald and Sinton and Miss Clur, Honours students working on projects under Professor Hancock, are investigating:- open water and epiphytic algal associations in the drowned mouth of the Sina Mwenda, Lake Kariba; the algal associations in the Klip River, Johannesburg; and the marine algal associations on the Port Shepstone - Port Edward Coast line of southern Natal, in relation to the geology.

Mrs Lucas is carrying out cyto/taxonomic studies on the genus Pellaea, towards a Ph.D. degree. Mrs Frean has almost completed her studies for the M.Sc. degree, this is on electron microscope studies of the wall structure of pollen grains of certain Dicotyledonous genera. Professor van Zinderen Bakker, of the University of the Orange Free State, is co-supervisor of Mrs Frean's work.

Mr O. Kerfoot (ecologist) continues his researches on the ecology and phyto-geography of the Coniferae in Africa, and is also working on a geobotanical survey of a portion of the northern Cape, with particular reference to heavy metal mineralisation. Students working under Mr Kerfoot are:- Mr Janse van Rensburg for a Ph.D. degree on "An ecological Survey of the Kafue River Basin, Zambia"; the following for the degree of M.Sc.: - Mr Lavranos on "A Comparison of the Vegetation of South West Africa and North East Africa with particular reference to the arid zone"; Mr Seagrief on "The Factors affecting Agriculture in the Marandellas group of intensive conservation areas"; Mr Henning on Colophospermum mopane Kirk ex Leonard in Southern Africa, and its ecological and biotic relationships". His Honours students, viz. Messrs King, Macdonald

and Miss Tilney, are carrying out researches on the following projects:- A geobotanical survey of the Lobatsi district in Botswana with reference to copper mineralisation; the genus Combretum in Rhodesia with particular reference to certain plant formations, and an ecological study of certain species of Loranthaceae in the Transvaal.

Dr R.E. White (soil scientist) is working on the following:- Studies on the absorption of $H_2PO_4^-$, K^+ and Ca^{++} ions by intact plants under controlled environmental conditions; A study of factors influencing the growth, development and distribution of Colophospermum mopane in southern Africa; Studies on the uptake and accumulation of heavy metals by Pentzia incana and Salvia spp. Mrs Scott and Miss van der Mark, students working under him, are studying thermoperiodic effects on the growth, anatomy, including fine structure, and chemical composition of maize; and the mineral nutrition of selected African Trifolium and medical species respectively.

Dr E. Lawson (mycologist and microbiologist) is investigating the genetics, physiology and ecology of certain actinomycete species. Messrs Choritz and Trichorides, students reading for the degree of M.Sc. under her guidance, are investigating the effects of certain environmental factors on the production of antibiotics by strains of Streptomyces species, and comparing pathogenicity between species of Fusarium with particular reference to plant-growth conditions on fungal toxin production on Dianthus caryophyllus respectively. Honours students, viz Misses van der Mark and Clur, are carrying out investigations on various plant diseases, and the bacteriology of Klip River water, in connection with hydrobiological studies, respectively. There has also been a visiting mycologist for a year, Dr E.J. Moore-Landecker. She has been carrying out the following research projects, and both have now been submitted for publication: "Ultrastructural observations on the association of acid phosphatase with fungal vacuoles" (J. Gen. Microbiol.) and "Ultrastructural observations on lamellar and tubular membrane configurations in fungi" (Cytologia).

Dr R. Lubke, who joined the Department in January of this year, to fill the post for Taxonomy and Anatomy, is working on:- Taxonomic studies on the South African flora; Investigations into the function and evolution of the awn of the Gramineae and the use of statistical methods in the study of plant distribution. An Honours student, working under him, viz. Miss Tilney, is working on the

taxonomy of some members of the South African Loranthaceae.

Mrs M. Purves (plant biochemist) who has recently been awarded the degree of M.Sc. is now reading for a Ph.D. degree, her title being "An Investigation into the Phytochemistry (phenolic compounds, amino acids, sugars and sesology) of members of the Amaryllidaceae and its possible uses as a criterion in the Classification of this Plant Group".

Mrs Forbes, a bursar reading for the degree of Ph.D., is carrying out "A Revision of Fuirena Rottb. in Southern Africa, with particular reference to the phylogenetic relationships of the Genus". Dr Gordon Gray, of the University of Natal, is co-supervisor of this work.

The Curator of the Herbarium, Mrs L.E. Davidson, and the Herbarium Assistants, Mrs M. Macnae and Dr A.O.D. Mogg, continue to carry out important taxonomic and ecological investigations and recording these in check lists. Specific areas are Belvedere Valley, of the Blyde Canyon Reserve, Oribi Gorge, Inhaca Island, and Sterkfontein and Zwartkrans Cave areas. The flora of the Witwatersrand is kept up-to-date, and Mrs Davidson recently supervised an Honours student working on the taxonomic significance of the anatomy and gross morphology of certain species of Senecio. She is also supervising an M.Sc. student, Mr Maguire, who is investigating the plant foods of the Kalahari Bushmen.

The staff is hoping to embark, as a team, shortly on a complete survey of the Okarango-Botletle-Lake Dow drainage system.

The Department is experiencing difficulties in obtaining suitable equipment and trained technicians. The phytotrons are emerging from their teething troubles, and good work is now being achieved in them.

S.A.A.B.:-

At a Council meeting on 25 August in Pretoria Dr A. Eicker, of the Department of General Botany, University of Pretoria, was elected Secretary.

Any further information from this meeting will be reported in a future issue of the 'Forum'.

MEMBERS NOT PREVIOUSLY RECORDED IN THE FORUM BOTANICUM:-

Institutional Members:

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S.A.A.B. (EASTERN CAPE SECTION):-

Dr R. Melville, of Kew, gave a talk on plants in danger of extinction to this Section on Wednesday, 19th August. It was attended by 35 people. Members also attended two other talks he gave in Grahamstown during the same week.

TOBACCO RESEARCH INSTITUTE, RUSTENBURG:-

The following research projects undertaken by the Tobacco Research Institute, may be regarded as falling under the plant sciences.

1. Breeding of tobacco cultivars resistant to diseases such as tobacco mosaic virus, powdery mildew (Erysiphe cichoracearum) and black shank (Phytophthora nicotianae var. nicotianae); cultivar evaluation in main tobacco producing areas of South Africa. Wild relatives of Nicotiana tabacum (Nicotiana species) are used as sources of resistance.
2. Breeding of tobacco cultivars resistant to the root-knot nematode Meloidogyne javanica. Nicotiana repanda is used as a source of immunity.
3. Effect of spacing and topping of tobacco plants on yield and quality of the cured leaf.
4. Chemical control of weeds in tobacco.
5. Chemical control of sucker growth after destroying apical dominance by topping tobacco plants.
6. Effect of anti-transpirants on survival and growth of tobacco transplants.
7. In situ determination of P³² in growing plants and root development of tobacco plants.

8. Water requirements of tobacco plants and methods of water application.
9. Control of seedling diseases in tobacco.
10. Studies of environmental factors affecting the development of black root rot (Thielaviopsis basicola), powdery mildew (Erysiphe cichoracearum), black shank (Phytophthora nicotiana var. nicotiana) and brown spot (Alternaria longipes).

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