FORUM BOTANICUM

VOL. 21, No. 11 NOVEMBER 1983

ISSN 0015-847X

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

FORMAT OF FORUM BOTANICUM: The cost of producing and distributing Forum has increased dramatically over the last few years. Despite the considerable support given in the past by the Botanical Research Institute and recently by the Uni= versity of Stellenbosch, the Forum bill for 1983 will run to approximately R1400, split 50/50 for production and postage. Even though SAAB gratefully receives a substantial grant from the Department of National Education towards covering these costs the President and Editor have felt the need to introduce some method of cost reduction. From several suggestions submitted to it the Executive Committee recommended to Council that the format be reduced from A4 to A3 thus cutting production costs by half. This was unanimously accepted by Council with the proviso that the change take place at the beginning of the next volume, i.e. January 1984.

NB: LIBRARIANS PLEASE NOTE CHANGE IN FORMAT when sorting current and previous volumes for binding.

BOTANICAL RESEARCH INSTITUTE; REVIEW OF THE WORK FOR 1982/83 (continued):

PLANT STRUCTURE AND FUNCTION SECTION. During May 1982 the laboratories and staff were moved to Velcich House in the grounds of the Pretoria National Botanical Garden. This has proved beneficial as additional laboratory and office space was acquired and a potential fire threat was removed from the National Herbarium building.

Comparative grass leaf anatomy. In June 1982 Dr. R.P. Ellis, who is in charge of this Section, undertook a three week study tour to the Smithsonian Institution, Washington and the Museo Argentino de Ciencias Naturales, Buenos Aires. A short stopover was made at the Jodrell Laboratory, Kew, United Kingdom en route. Possible co-operation with the revision of the Gramineae volume of Metcalfe's Anatomy of the Monocotyledons was discussed with Dr. C.R. Metcalfe and Dr. D.F. Cutler at Kew. Preliminary findings of the bamboo anatomy studies were evaluated with Dr. T.R. Sonderstrom of the Smithsonian Instution with expansion of the project in mind. In Argentina Dr. E. Sanchez was visited to discuss our joint

interests in grass leaf anatomy. In addition, over 200 freshly fixed specimens of grass leaves were acquired for anatomical study.

Locally 250 grasses were collected and prepared for anatomical study. Collections were made in Maputaland, the Kalahari and South West Africa/ Namibia. The leaf anatomy of Asthenatherum was written up and the final paper on the genus Merxmuellera was published. A paper on the leaf anatomy and taxonomy of Lintonia nutans was also completed.

Grass identification by epidermal structure for herbivore food preference studies.
Mrs. R. Botha has continued with her examination of variation in epidermal characters of three widely distributed South African grasses. The results confirm that geographical variation is mainly quantitative in nature and, con= sequently, does not affect the identification of the grass species. However, distinct differences were found to exist in the epidermal structure of different parts of the same plant. The leaf lamina, leaf sheath, inflorescence bracts and culms were compared for this purpose, as were the ab- and adaxial surfaces. Surface differences were most apparent on the leaf sheaths and bracts. This observation implies that abaxial leaf blade characteristics, which are general= ly assumed to be representative of the whole plant, are not typical of that portion of the plant which is grazed by herbivores and thus, basic assumptions in the technique of microscopic faecal analysis are questioned.

The uneveness of cuticle distribution on a single plant is another aspect of epidermal structure which affects the quantification of this method. Young tissue was seen to possess little or no cuticle and in vitro digestibility studies showed that the digestibility of grass tissue decreases with age and that the leaf sheaths are less digestible than the leaf blades.

Cytogenetic studies. Very good progress has been made with the cytogenetic studies of Lantana camara and Mr. J.J. Spies has been able to show that L. camara only reproduces sexually. Hybridization within, and between, different polyploid levels is of general occurrence resulting in new gene com= binations in the hybrid offspring. This implies that this already aggressive weed has the potential to spread at an increased tempo and additional eradica= tion measures must, therefore, be urgently implemented. It has also been demonstrated that L. camara has a basic chromosome number of x = 5 + 6, and not x = 11, as has been generally accepted in the past.

In addition, Mr. Spies and Miss J.C.P. Loots have initiated an embryo sac study of the Eragrostis curvula complex in an attempt to gain a better understanding

of speciation and hybridization in this taxonomically very complex group of grasses. This work is being carried out in conjunction with the National Transport Commission which is evaluating a wide range of E. curvula ecotypes for use in the stabilization of road cuttings and embankments.

DATA SUB-SECTION. During the course of the year two new major systems were developed on the Burroughs 7800 computer belonging to the Department of Agri= culture. The revised form of the Herbarium specimen data base, PRECIS, was handed over to the Institute in April 1982. Under the guidance of Mr. P. Gonsalves, it has functioned with great success. All the outstanding backlog of new specimens which had accumulated over the past two years, plus the current year's accessions, were loaded, as well as seven years' backlog of corrections to species names, plant collectors and specimen data. For the Ecology Section, Mr. R.H. Westfall has transferred to the Burroughs his package of programs to classify vegetation types, known as PHYTOTAB. Mrs. B.C. de Wet adapted the system to run on the Burroughs machine. Both systems are more flexible in their output than previous systems, and their operating costs are less.

Systems that have continued from previous years on the Burroughs are Garden Records, under the control of Mrs. de Wet; Register of Names and Types in Poaceae, developed by Dr. G.E. Gibbs Russell; and sorting programs for vege= tation data used by ecologists at the Stellenbosch Unit.

The Hewlett-Packard 9845B desktop microcomputer was updated with a floppy disk drive, and with this increased memory, new data banks have been established. Mr. J.J. Spies has developed records of chromosome numbers in Poaceae from a range of literature references and Mr. T.H. Arnold has developed a data base of locality records for primitive crop cultivars. Previous uses of the Hewlett-Packard for address labels, word processing, plotting of graphs and diagrams, and taxonomic applications such as Determinavit slips and distribution maps has continued.

ECOLOGY SECTION.

Transvaal bushveld studies. Mr. R.H. Westfall has completed his pilot study of the Sour Bushveld (Veld Type 20) and a number of papers on various aspects of the work have been published or are being prepared for publication. Sug= gestions for the application of veld condition assessment in respect of grazing potential in bushveld vegetation include the use of frequence in 1 m^2 quadrats to determine percentage composition. Preparations for the next phase of these studies have reached an advanced stage.

South African Savanna Ecosystem Project. The first two phases of this project having been completed, Dr. M.C. Rutherford has published numerous papers on a variety of aspects of the research results. He is currently engaged in rounding off his contributions on the first two phases, as well as working on the third phase of setting up predictive models of relevant components of the system and ascertaining the limits over which the modelling is applicable. Much of this work has been done during his study leave at the University of Osnabrück in West Geramny.

Transvaal forest survey. Mr. G.B. Deall has distinguished approximately 40 different floristic associations (representing three major physiognomic classes) distributed throughout six broad physiographic zones in the Sabie area. Forests (11 associations), dominate the Eastern Escarpment Slopes. Closed and Sparse Woodlands (11 associations) dominate the Escarpment Foothills and Valley Lowlands. Open Woodlands (four associations) occur on the exposed Escarpment Ridge and Upper Mountain Slopes, whereas grasslands (11 associations) dominate the Escarpment Plateau and Upper Mountain Slopes.

Coastal studies. The report by Dr. P.J. Weisser on vegetation and conservation priorities in Reserve 10 (KwaZulu) has been finalized, submitted and accepted. New map and air-photo coverage of the Mtunzini Area has enabled him to do further research on dune advancement and vegetation rating to be completed. He has started fieldwork and air-photo interpretation of the vegetation of Reserve 7 (between Tugela River and Matigulu Lagoon, KwaZulu).

Mr. M.G. O'Callaghan has studied and mapped the aquatic, semi-aquatic and adjoining terrestrial vegetation of 17 Cape estuaries. Of these, five accounts have been published in CSIR reports. During this period, work was concentrated on the south-western and southern Cape coast. It was found that very few of these rivers have much in the way of undisturbed natural vegetation. Most disturbance is due to the encroachment of alien plants and development.

Aquatic ecology. Aquatic vegetation data collected in coastal and inland water bodies in Natal were resynthesized by Dr. C.F. Musil using PHYTOTAB, a computer-based classificatory approach. He has prepared a report on this work which will provide the basic text for a series of papers due for publication in the near future. He is also preparing a series of papers on the development and refinement of a model for predicting yields, growth rates, and amounts and frequencies of harvest of Eichornia crassipes to control both nutrient inputs and excessive growth of this plant in eutrophied water systems.

Cape fynbos studies

(a) Vegetation survey of the Cape of Good Hope Nature Reserve. Mr. H.C. Taylor has prepared papers on this survey for publication. Analysis of the check list reveals that, whereas the Nature Reserve occupies only 16% of the area of the Cape Peninsula, the flora comprises some 41% of the flora of the whole Peninsula.

(b) The vegetation of Swartboskloof, Jonkershoek. The field sampling and data processing for this facet have been completed by Mr. D.J. McDonald. The forest and fynbos vegetation have been treated separately, because they are structurally and floristically different. Analysis of the data shows that this fynbos vege= tation can be classified into 15 groupings (noda), whereas the forest vegetation can be grouped into six. These plant-community types are being ranked and described.

(c) A study of the vegetation along transects through the Western Cape forelands Mr. C. Boucher has completed the analysis of floristic data collected along three transects through the western Cape foreland between the Berg River and False Bay and distinguished 43 plant communities. Analysis of structural data, collected together with these floristic data, showed that veld types could be readily identified on a non-floristic basis, but that finer community differences could not be differentiated clearly. Mr. Boucher has also incorporated plant-community data from other published and unpublished sources into the transect-data matrix. Ninety-four plant communities have been identified and uniformly named in the area. Draft proposals, in collaboration with other authors, have been produced for a new sub-division of the Fynbos Biome as a whole. It is now possible to place the western lowland communities in a wider and reasonably natural framework.

(d) Ecophysiological research. The effects of competitive stress between Protea repens (suikerbos) and an invasive woody alien, Acacia saligna (Port Jackson), are being investigated by Miss F.M. Pressinger. Results to date indicate that A. saligna has greater tolerance of moisture stress and ability to compete for limited space and moisture than P. repens in high-density stands of seedlings. The presence of A. saligna increases the mortality rate but also increases the growth rate resulting in taller and more massive P. repens seedlings. The initial height of the seedling plays a major role in deter= mining the fate of the plant.

Ecological literature indexing. The plant ecological bibliography for southern Africa up to 1975 (Vol. 1) is being finally proofread under the supervision of Miss A.P. Backer and Mr. R.H. Westfall. Work has commenced on the next volume covering 1976 to 1980.

PLANT EXPLORATION SECTION

This section, under Mr. M.J. Wells, is concentrating its attention on food plants research, and related aspects such as the conservation of germ plasm. Other utilization facets, as well as weed research (taken over by the Plant Protection Research Institute) are being phased out.

Crop plants of African origin. A total of 732 seed and herbarium collections of primitive crops of African origin were made by Mr. T.H. Arnold, Mrs. K.J. Musil and Mr. A.A. Balsinhas. 245 seed samples of Sorghum were tested for tannin content and the percentage frequency of occurrence of tannins in each of the five Sorghum races was calculated. A form, which contains tannin (i.e. is 'bird resistant'), but in which the tannins are 'non-reactive' during beer-brewing has been found. Another potentially valuable collection is of a num=ber of apparently virus-resistant Citrullus (watermelons) - one of 69 Citrullus collections made. 95 collections of Lagenaria (gourds) were examined for character associations, but only a few loosely-linked characters were found. In a taxonomic study of Pennisetum (pearl millet) Mrs. B. Pienaar has thus far, examined 90 specimens for 21 character states.

Indigenous food plants

A national food-plant data-bank is being built up by Mr. A.A. Balsinhas and Mr. T.H. Arnold. About 140 elements of information are gathered about each species. To date 322 species in 40 plant families have been processed.

Conservation of germ plasm. Over 200 collections of seed of primitive crop plants were incorporated in the germ plasm bank by Mrs. K.J. Musil. A similar number were grown in order to increase the seed available. Seed was distributed to other users/germ plasm banks, including 109 samples ti ICRISAT.

130 families of Africans were interviewed regarding their crop-preferences, in order to determine which crop variants were coming under pressure. These data have been computerized to aid in analysis and mapping.

Wood use. A survey of wood use by the Tsonga in a portion of Gazankulu was completed by Miss C.A. Liengme. It revealed that the average annual timber-use per family is 5,4 tonnes of firewood and 0,23 tonnes of building timber. Almost all the timber used in Colophospermum mopane.

Border Cave. Re-dating of the strata of the deposit by the co-operating archaeologist may open the way to publication of the botanical part of this survey, which was completed by Dr. J.M. Anderson some years ago.

Tree distribution in the Transvaal. The field work for this study by Dr. J.M. Anderson has been virtually completed and only a few extra field recordings were added in the last year. A further 148 of the species have been illustrated by Mrs. J. van Gogh, bringing the total of 378 of the ± 900 woody species included in the study.

Barrier plants. Miss L. Henderson has completed data forms for 200 out of a total of 210 priority barrier species, and 109 species have been photographed for the projected publication on barrier plants.

Information service. Our scientific information service co-ordinated by Mrs. D.M.C. Fourie has handled 556 requests for information about economic plants and their utilization or control. These included 101 identifications, 157 telephonic enquiries and 298 postal requests. A topical investigation carried out by Mrs. Fourie in conjunction with the CSIR was on drought resistant plants for gardens in South Africa. Our Public Relations Officers, first Mrs. B. Pienaar en later Mrs. S.D. Hewitt took 51 groups, comprising 2 104 visitors on tours of the Institute and garden. Mr. Balsinhas continued to curate the colour slide collection and to assist in collecting requested material.

National Weed List. Classification of the ± 1 600 species in the list was completed by Mrs. V. Engelbrecht of the Plant Protection Research Institute and needs only to be checked before it can be published.

Woody invaders. A survey of exotic woody invaders in the Transvaal was completed by Miss L. Henderson and Mrs. K.J. Musil, with samples along 2 000 km of roads and at 217 river crossings, in 64 x $\frac{1}{4}$ degree squares. A total of 60 invader species was recorded. Their distribution, frequency and aggressiveness were analysed and the main dangers of invasion summarized.

Taxonomy of Ficinia: A publication on the morphology of the section Bracteosae was completed by Mr. T.H. Arnold.

PRETORIA NATIONAL BOTANICAL GARDEN.

A total of 1 135 accessions, including 343 research accessions (mainly Eragrostis, Lantana and Citrullus) was received and accessioned by the records team: Mrs. B.C. de Wet and Mrs. K.P. Clarke. Many plants, including Madagascan species, flourished in the new 'rare and endangered' house, to which they were transferred by Mr. D.S. Hardy. Garden staff under Mr. H.J. de Villiers concentrated on maintenance under drought conditions, but also expanded biome plants. We were all very sad to lose one of our farm foremen, Mr. G.J. Stolz, who died as a result of an accident whilst on the way to work.

FLORA OF SOUTHERN AFRICA NEWS: During the 1983 SAAB Congress at Wits, there was a meeting of participants in the Flora of Southern Africa. At that time it was decided that such meetings would be held annually during the SAAB Congress, and that during the year participants would be kept informed of the progress of the Flora through a "Flora Newsletter". The Editor of Forum Botanicum has kindly allowed this to appear as part of Forum.

The next meeting will be held during the Cape Town SAAB Congress, with the date and venue to be announced later. The following items will be discussed:

1. Progress report of FSA
2. Plan of FSA (1983 edition)
3. List of genera with latest revisions, and ongoing research
4. List of southern African species
5. Advisory Committee for FSA
6. FSA Newsletter
7. "Prodromus" or "Conspectus" production
8. Fellowships on contract
9. Distribution maps
10. Report by Prof. Almborn on lichen research.

Any other items that should be discussed can be communicated to The Director (attn. Dr. Beth Gibbs Russell), Botanical Research Institute, Private Bag X101, Pretoria 0001, for inclusion in the final Agenda.

Progress with the Flora so far during 1983

Flowering Plants & Cryptogams

Published: Vol. 7,2,2: Syringodea and Romulea by M.P. de Vos

In Press: Vol. 21, 1: Tiliaceae by H. Wild.

Vol. 33,7,2: Gnaphaliinae by O.M. Hilliard.

With editor: Vol. 4,2: Xyridaceae-Juncaceae -- still waiting for Aneilema by R. Faden.

Vol. 8: Orchidaceae: text and maps of Eulophia, Satyrium and Brownleea received.

Vol. 14: Crassulaceae: All material received, one new Crassula sp. still to be described and one Kalanchoe group is still being considered by H.R. Tölken.

Vol. 18,2: Simaroubaceae-Burseraceae: still waiting for Rubiaceae by F. White.

Vol. 26,2: Lamiaceae by L.E. Codd: Most of MSS seen.

Bryophyta 1,2: complete text (except Bryaceae which are being done by J. van Rooy) and several plates, also some of fascicles 3 and 4 have been received.

Pteridophyta: Text and maps of all but ± 12 spp. received as well as copies of drawings of most species.

Palaeoflora

Molteno Formation: Vol. 1, on Dicroidium: Material has been with Balkema for over a year as a result of differences of opinion concerning the quality of the printing of plates. Publication is now fairly confidently expected by the end of 1983.

Vol. 2, dealing with about 13 genera and 45 spp. of cycads, ginkgos, conifers and seed ferns. Production is under way.

Prodromus of South African fossil floras (megaplants): Covers 300 pages with 150 plates; gives a taxonomic review of all genera and approximately 175 species, plus accounts of about 30 of the principal collectors of plant fossils in South Africa.

Parts of the Flora of Southern Africa published before 1983

Vol. 1 (1966)	Dyer, Verdoorn, Leistner, Jessop, Marsh, Poynton, Anderson, Obermeyer: Stangeriaceae, Zamiaceae, Podocarpaceae, Pinaceae, Cupressaceae, Welwitschiaceae, Typhaceae, Zosteraceae, Potamogetonaceae, Ruppiaceae, Zannichelliaceae, Najadaceae, Aponogetonaceae, Juncaginaceae, Alismataceae, Hydrocharitaceae.	Total species: 114
Vol. 10,1 (1979)	Wiens, Tölken: Loranthaceae, Viscaceae.	Total species: 54
Vol. 13 (1970)	Marais, Codd, Killick, Tölken, Marsh, Leistner, Obermeyer: Brassicaceae, Capparaceae, Resedaceae, Moringaceae, Droseraceae, Roridulaceae, Podostemaceae, Hydrostayaceae.	Total species: 278
Vol. 16,1 (1975)	Ross: Mimosoideae.	Total species: 90
Vol. 16,2 (1977)	Ross: Caesalpinoideae.	Total species: 130
Vol. 22 (1976)	Du Toit, Obermeyer, Killick, Robson, Codd, Langenegger, De Wilde, Hilliard: Ochnaceae, Clusiaceae, Elatinaceae, Frankeniaceae, Tamaricaceae, Canellaceae, Violaceae, Flacourtiaceae, Turneraceae, Passifloraceae, Achariaceae, Loasaceae, Begoniaceae, Cactaceae.	Total species: 112
Vol. 26 (1963)	Dyer, Meeuse, De Winter, Verdoorn, Marais, Codd: Myrsinaceae, Primulaceae, Plumbaginaceae, Sapotaceae, Ebenaceae, Oleaceae, Salvadoraceae, Loganiaceae, Gentianaceae, Apocynaceae	Total species: 306
Vol. 27,4 (1980)	Dyer: Asclepiadaceae (Brachystelma - Riocreuxia)	Total species: 130

Cryptogams (1978)	Wood: Charophyta.	Total species: 45
Bryophyta (1981)	Magill: Sphagnaceae - Grimmiaceae	Total species: 190

Visits by overseas contributors to the Flora

Dr. Ove Almborn of Lund, Sweden is visiting southern Africa from September to November. He worked in the Bolus Herbarium and at Stellenbosch and did some field work in the southwestern Cape. Towards the end of his stay he will visit Pretoria to discuss the production of the Flora volume on Lichens, and to do some fieldwork in the Transvaal.

Dr. Tom Sonderstrom of the Smithsonian, Washington, USA, spent three weeks in Pretoria with Roger Ellis, working on the tribal classification of the Bamboos. He has promised to write the treatment of the Bambuseae for the Flora.

Prof. Sid Ash of Weber State College, Utah, USA, will work with John and Heidi Anderson in Pretoria for 6 months. He is a specialist on upper Triassic fossil floras, and will spend his time here studying the Cycads and Bennettitales of the Triassic to lower Cretaceous. He will contribute to Andersons' synthesis of global Triassic genera.

FYNBOS VEGETATION - A CONSERVATION PRIORITY: This is the motivation for a very fine calendar for 1984 published by the Cape Department of Nature and Environmental Conservation. Called FYNBOS CALENDAR it highlights the challange to conserve this rapidly dwindling unique vegetation. Superbly illustrated with large colour close-up photographs of some Cape species, it costs only R2 (including tax and postage) and is obtainable from the Provincial Accountant, Private Bag 9064, CAPE TOWN, 8000

PLANTKUNDIGES!! 'n Navraag van Bloemfontein onlangs ontvang deur die SAGP Sekretaris vra vir "inligting oor die beurse, diensvoorwaardes, Mammalogie en Ornitologie van Plantkundiges". Interessant!

==========

EDITOR/REDAKSIE

Mr. E.G.H. Oliver
P.O. Box 471
STELLENBOSCH
7600