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Notes on the vegetation of the Sani Pass area of the southern Drakensberg

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ABSTRACT

The vegetation of the Sani Pass area of the southern Drakensberg between 2 600–3 260 m is briefly described and illustrated. Air temperature and rainfall data are provided. A reference is made to the *Themeda triandra* Grassland occurring on the summit of the Drakensberg at Ngwangwana Pass (Thamatuwe Pass), some 30 km south of Sani Pass.

RÉSUMÉ

NOTES SUR LA VÉGÉTATION DE LA RÉGION DU COL DE SANI DANS LE DRAKENSBERG MERIDIONAL

On décrit et illustre brièvement la végétation de la région du col de Sani dans le Drakensberg méridional entre 2600 *et* 3260 *m, avec inclusion des données sur la température de l'air et la pluviométrie. On mentionne la prairie à* Themeda triandra *qui se rencontre au sommet du Drakensberg au col de Ngwangwana (Thamatuwe), quelque* 30 *km au sud du col de Sani.*

INTRODUCTION

Since 1958 the author has several times visited the Sani Pass area of the southern Drakensberg, the last occasion being from 12–20 January 1977, when the author and a colleague, Mr P. C. V. du Toit, were based at the Mountaineers' Chalet situated at the top of the Pass at 2 865 m. Altogether nearly 400 numbers were collected between 1 980 and 3 257 m, the summit of Hodgson's Peak. Ecological observations were made and it was felt that, since little has been written about the vegetation of the southern Drakensberg, it might be useful to describe very briefly the vegetation of the Sani Pass area and to illustrate it rather profusely. The only published description of vegetation in the southern Drakensberg known to the author is in Galpin's paper (1909) on the Ben McDhui—Tsatsana Berg area, about 175 km further south.

CLIMATE

Temperature data for the Alpine Belt as a whole are meagre, therefore any additional data that can be obtained should be made known. During January 1977 the author measured maximum and minimum temperatures for an 8-day period on the summit of Sani Pass at 2 865 m (Fig. 1). The highest temperature recorded was 25,5°C and the lowest, 4°C. The daily maximum temperatures were 2–4 times greater than the corresponding minimum temperatures. A large diurnal range of temperature is characteristic of high mountains. The maximum temperatures recorded refute Van Zinderen Bakker and Werger's contention (1974) that temperatures do not exceed 16°C in summer.

Unfortunately, owing to the breakage of thermometers in transit, it was not possible to obtain temperature records for the soil and soil surface. Van Zinderen Bakker & Werger (*l.c.*) maintain that the nightly minimum temperatures at soil level in the Alpine Belt are below freezing point throughout the year and that up-freezing of the soil occurs daily in mid-summer on exposed sites, but no supporting data were provided. With nightly temperatures as low as 4°C (Fig. 1), these statements do seem credible. However, the present author saw no signs at all of up-freezing soil or frozen water in still, bog pools even at dawn and above 3000 m.

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Rainfall records for a 15-year period at Sani Pass summit were kindly supplied by the Hydrological and Meteorological Department of Lesotho. Mean monthly and annual rainfall data are given in Table 1. Mean annual rainfall is 995,8 mm, which is higher than at Letšeng-la-Draai (713,6 mm) at 3 050 m, but lower than at Organ Pipes Pass (1609 mm) at 2 927 m.

TABLE 1.—Mean monthly rainfall in mm at Sani Pass Summit

Altitude	2 865 m
Latitude	29° 35′
Longitude	29° 16′
Period in years	15
January	163,7
February	159,6
March	121,6
April	55,8
May	36,9
June	12,5
July	19,1
August	16,0
September	35,9
October	89,5
November	136,3
December	148,9
Total	995,8

Important ecologically are periods of drought and high rainfall. Between 1932 and 1947 there were three drought periods of 120 days duration: May-August 1937 (total rainfall 11 mm); May-August 1941 (total rainfall 20,1 mm) and June-September 1945 (total rainfall 6,1 mm). These dry periods occurred during winter when snow can be expected to add to precipitation. The lowest annual rainfall recorded was 439,3 mm during the hyetal year 1944/45 and the highest rainfall 1 441,6 mm during 1938/39.

See Killick (1978: pp. 567–572 of the present work) for further details of the climate of the Alpine Belt.

VEGETATION

The investigation can be described under the headings Alpine and Subalpine Belts.

1. Alpine Belt

In the Sani Pass area the Alpine Belt extends from about 2 740 m to 3 260 m (or 3 480 m if Thabana Ntlenyane, which was not visited, is included in the area). As in other parts of the Drakensberg, the summit presents a bleak and barren-looking picture (Fig. 2) of low grassland interspersed by bogs and isolated patches of heath.

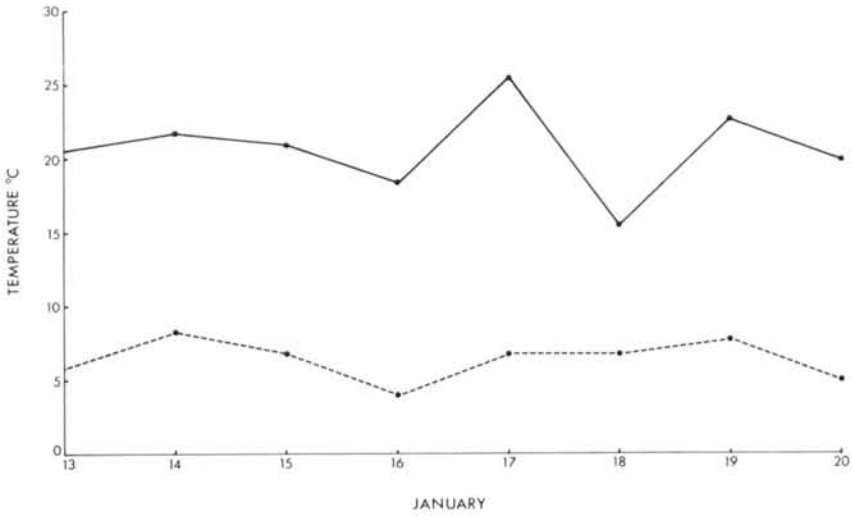

FIG. 1.—Curves for maximum and minimum temperature for Sani Pass summit from 13–20 January 1977.

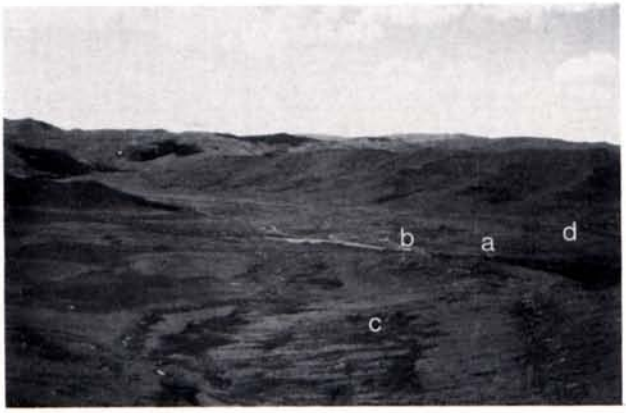

FIG. 2.—Sani Pass summit from slopes of Hodgson's Peak. a, Mountaineers' Chalet; b, Border Post; c, extensive community of *Merxmuellera drakensbergensis;* d, bog area.

FIG. 4.—Part of bog area at head of Sani River.

FIG. 3.—Bogs occuring as flushes on mountain slopes in the Sani River Valley. In the foreground are tussocks of *Merxmuellera drakensbergensis*, grey patches of *Karooochloa purpurea*, *Chrysocoma tenuifolia* and *Helichrysum flanaganii*.

FIG. 5.—*Crassula inanis* (showing up white) and *Lagarosiphon muscoides*, two aquatics in a bog pool.

1.1 *Bog communities*

The bogs are of two kinds: firstly, those occurring as flushes or seepage areas (Fig. 3) on the mountain slopes and secondly, those found on fairly level areas (Fig. 4) at the head of the Sani River about 1–2 km north of the Mountaineers' Chalet.

1.1.1 *Pool Communities*

Aquatics occurring in bog pools are *Crassula inanis*, *Lagarosiphon muscoides* (Fig. 5), *Nitella dregeana*, *Aponogeton junceus* and in very shallow water, *Colpodium* sp. (*Killick & Du Toit* 4154), *Limosella capensis* and a form of that species with elliptic leaves (*Killick* 4102). The grass *Colpodium* sp. was originally identified as *Catabrosa aquatica* [Anderson in Bothalia 10: 73 (1969)] and later as *Colpodium hedbergii*, a species described from Mount Elgon in Kenya. However, this grass, which is of considerable phytogeographical interest, may receive another name as a result of Professor Hedberg's present studies of the *Colpodium-Keniochloa* group.

Van Zinderen Bakker & Werger (1947) describe the grass as "floating". It is not quite clear in what respect the grass floats. All the plants seen by the present author are either rooted in mud at the bottom of shallow pools with the leaves projecting upwards through the water or the plants grow on stream-banks (see 1.2).

1.1.2 *Semi-aquatic Communities*

These communities are found on moist to wet soil in a variety of habitats such as hummocks (thufur), level areas and mud-patches. An important semi-aquatic is the moss *Bryum aulacomnioides*, which often forms the matrix of sponges invaded by higher plants. Other mosses include *Tortella inclinatum* and *Braunia secunda*. Higher plants are *Scirpus diabolicus*, *Crassula vaillantii*, *Limosella longiflora*, *L. capensis* (frequently amongst small stones, Fig. 6), the minute *Agrostis subulifolia*, *Ranunculus meyeri*, *R. multifidus* (higher altitude form), *Haplocarpha nervosa*, *Lobelia galpinii*, *Cotula paludosa*, *Trifolium burchellianum*, *Rhodohypoxis rubella*, *Cerastium capense*, *Alepidea pusilla*, *Athrixia fontana*, *Senecio cryptolanatus* (Fig. 7), *Erica frigida*, *Aster pinnatifida*, *Felicia uliginosa*, *Eriocaulon sonderanum*, *S. concolor*, *S. tugelensis*, *Venidium microcephalum*, *Kniphofia caulescens*, *Geranium incanum* and *Moraea alticola*. These plants frequently produce a closely-knit mat of vegetation (Fig. 8) and occur in various combinations.

FIG. 6.—*Limosella capensis*, with white flowers, growing amongst small stones in a bog.

FIG. 7.—A mat of semi-aquatic bog vegetation consisting of *Bryum aulacomnioides*, *Limosella capensis*, *Lobelia galpinii*, *Cerastium capense*, *Rhodophypoxis rubella*, *Trifolium burchellianum*, *Ranunculus multifidus* and *Scirpus diabolicus*.

FIG. 8.—Bog with flowering *Senecio cryptolanatus* (chiefly), *Athrixia fontana*, *Felicia uliginosa*, *Alepidea pusilla* and *Moraea alticola*.

On drier soil usually, at the edge of bogs, is what has been described by Killick (1963) as sedge meadow. At Sani Pass this community consists of *Kobresia filiforme*, *K.spartea*, *Carex monotropa*, *Helichrysum flanaganii* and almost any of the semi-aquatics mentioned above.

Killick (*l.c.*) referred to the hummocks in the Langalibalele Pass area and suggested that they were caused by a mole, *Chlorotalpa guillarmodii* or a mole-rat, *Cryptomys natalensis*. However, Van Zinderen Bakker (1965) regarded the hummocks as homologous to the thufur of Iceland, which are caused by frost action. Harper (1969) and Van Zinderen Bakker & Werger (1974) concurred. Hummocks or thufur are present in the bogs of the Sani Pass area (Fig. 9), but also present is an abundance of freshly-made earth mounds, clearly the result of animal activity (Fig. 10). The question of hummock formation in Lesotho obviously requires further study.

1.2 *Streambank communities*

Streams passing through bogs support on their banks the semi-aquatic vegetation described above. Elsewhere streambanks support *Merxmuellera drakensbergensis*, *Senecio achillaefolius*, *S. quathlambanus*, *Alchemilla woodii*, *Colpodium* sp. (*Killick & Du Toit* 4154), *Carex glomerabilis*, *Conium chaerophylloides*, *Alepidea thodei*, *Erica alopecurus*, *Kniphofia caulescens*

FIG. 9.—Hummocks or thufur in the bog at the head of the Sani River.

FIG. 11.—*Felicia drakensbergensis* growing amongst boulders near stream.

FIG. 10.—Recently-formed earth mounds in hummock area of bog.

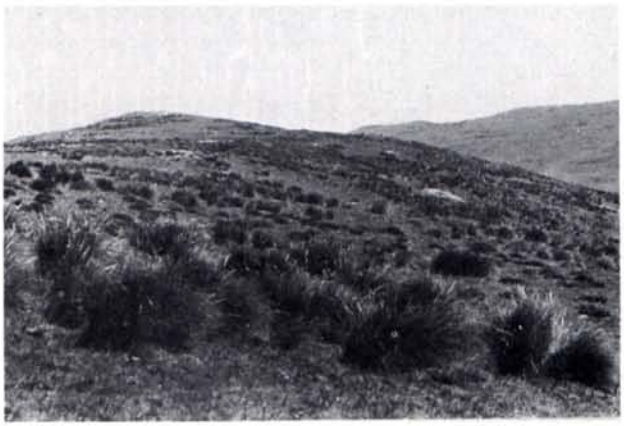

FIG. 12.—*Merxmuellera drakensbergensis* in Alpine Grassland.

and the bryophytes *Bryum muhlenbeckii* and *Philonotis laxissima*. On the banks of the Sani River near the wool-shed, the 30–50 cm-tall *Scirpus ficinioides* is dominant.

1.3 *Lithophilous Communities*

Basalt outcrops on the summit are common. The basalt is exposed as slabs or pavements, boulders or occurs as a litter of small stones. Frequent on outcrops are *Euryops decumbens*, a cushion-forming shrub, about 12 cm high, *Crassula peploides*, *C. setulosa* var. *curta*, *Zaluzianskya peduncularis*, *Z. capensis*, *Z. pulvinata*, *Craterocapsa montana*, *C. congesta*, *Romulea campanuloides*, *Delosperma clavipes*, *Ursinia montana*, *Glumicalyx montanus*, *G. lesuticus*, *Helichrysum aureum*, *H. marginatum*, *Thesium acutissimum*, *Felicia drakensbergensis*, (Fig. 11), *Lotononis galpinii*, *Clutia nana*, *Merxmuellera drakensbergensis* and *M. stereophylla*.

On moist outcrops *Scirpus falsus* is frequently dominant. *Merxmuellera drakensbergensis* is a ubiquitous species: it often lines streams or occurs in flushes; and it is found on rock outcrops and in Alpine Grassland, sometimes covering fairly large areas. *M. stereophylla*, on the other hand, seems restricted to dry outcrops chiefly at higher altitudes. The two species are closely related, but may be distinguished by the greyer colour of *M. stereophylla* and the leaf blades of *M. drakensbergensis* which break, split and recurve immediately above the ligule.

1.4 *Cliff Communities*

Several mosses occur on vertical cliff faces. They include *Leptodontium viticulosoides*, *Bryum argenteum*, *Breutelia diffracta* and in wet places *Hyophila zeyheri*. *Tortella inclinatum*, *Hypnum cupressiforme* and *Grimmia pulvinata* are found on cliff ledges. Higher plants observed on cliffs were the cushion-forming species, *Helichrysum pagophilum*, *H. splendidum* var. *montanum* and *Wahlenbergia pulvillus-gigantis*, and *Merxmuellera stereophylla*. At the base of the cliffs in wet places is *Kniphofia caulescens*, which forms extensive grey-coloured communities particularly below Kokotabagi, *Selago flanaganii*, *Myosotis afropalustris* and *Geranium* sp.

1.5 *Alpine Grassland*

During the January 1977 stay at Sani Pass, Mr du Toit made an intensive collection of grasses: altogether he collected 132 numbers, some species being collected more than once to include as much variation in form as possible. Apart from the usual dominants, *Festuca caprina* var. *caprina*, *Merxmuellera disticha* and *Pentaschistis oreodoxa*, the following species were collected: *Pentaschistis imperfecta*, *P. galpinii*, *P. natalensis*, *P.* sp. cf. *P. angustifolia*, *Koeleria cristata*, *Merxmuellera drakensbergensis* (Fig. 12), *M. stereophylla*, *M. guillarmodiae*, *Poa binata*, *Deschampsia caespitosa*, *Agrostis barbuligera*, *Anthoxanthum ecklonii*, *Harpochloa falx*, *Festuca costata* var. *costata*, *F. caprina* var. *macra*, *F. scabra*, *Eragrostis caesia* and *Ehrharta longigluma*. *Karroochloa purpurea* occurs further west on eroded north-facing slopes

together with *Merxmuellera drakensbergensis*, *Chrysocoma tenuifolia*, an invader from the Karoo, and *Helichrysum flanaganii* (Fig. 3).

Forbs present are *Sutera pristisepala*, *Diascia capsularis*, *Rhodohypoxis baurii*, *Helichrysum flanaganii*, *H. fulgidum*, *H. adenocarpum*, *H. aureum*, *H. setigerum*, *H. subfalcatum*, *Crassula natalensis*, *Manulea crassifolia*, *Androcymbium melanthoides*, *Geissorrhiza* sp. (4119), *Polygala hispida*, *Hirpicium armerioides* subsp. *armerioides*, *Glumicalyx montanus*, *G. flanaganii*, *Scabiosa columbaria*, *Bupleurum mundii*, *Senecio hypochoerideus*, *S. othonniformis*, *S. gramineus*, *S. tanacetopsis*, *S. inaequidens*, *S. barbatus*, *Psammotropha alternifolia*, *Dianthus basuticus*, subsp. *basuticus* var. *basuticus*, *Cotula radicalis*, *Lessertia thodei*, *Satyrium* sp. (4165), *Lobelia preslii*, *Wurmbea angustifolia*, *Albuca* sp. (4165), *Moraea alticola*, *Geum capense*, *Romulea rosea* var. *parviflora*, *Valeriana capensis* and *Kniphofia ritualis*. In addition, these are sometimes species from the Semi-aquatic (1.1.2) and Lithophilous Communities (1.3). During January 1977 the number of flowering herbs was low owing possibly to the dry summer experienced up to that time. January is usually the month for orchids, but only one species, *Satyrium* sp. (4165), was encountered.

It is interesting to note that in the Ngwangwana Pass (Thamatuwe Pass), about 30 km south of Sani Pass, the summit of the Drakensberg is so low (c.2590 m) that it supports not Alpine Grassland but *Themeda triandra* Grassland. Grass species noted were *Themeda triandra*, *Eragrostis capensis*, *E. caesia*, *Andropogon appendiculatus*, *Aristida monticola*, *Koeleria cristata*, *Pentaschistis oreodoxa*, *Merxmuellera drakensbergensis*, *Anthoxanthum ecklonii* with forbs such as *Glumicalyx lesuticus*, *Kniphofia brachystachya*, *Lotononis galpinii*, *Wurmbea angustifolia*, *Senecio othonnaeflorus*, *S. tugelensis*, *Dierama igneum*, *Craterocapsa montana*, *Erica alopecurus*, *Hirpicium armerioides* subsp. *armerioides* and *Ornithogalum* spp.

1.6 *Alpine Heath*

Alpine Heath in the Sani Pass area is very limited in extent. There are several patches of *Erica dominans* Heath situated in relation to the Chalet as follows: on south-facing slopes c. 3 km N; near edge of escarpment c.1. km NE (Fig. 13) and on S-facing slopes c. 1 km S. The following dwarf shrubs occur on the summit, sometimes in distinct communities: *Helichrysum trilineatum* (glabrous and grey-lanate forms), *Clutia nana*, *Basutica propinqua* and *Eumorphia sericea*.

FIG. 13.—*Erica dominans* Heath near the edge of the escarpment.

2. Subalpine Belt

The only communities studied in the Subalpine Belt, and superficially at that, were ecotonal grassland and fynbos.

2.1 *Ecotonal Grassland*

This grassland present in the uppermost part of the Pass, is an ecotonal community between Alpine Grassland and *Themeda triandra* —Temperate Grassland. Thus, occurring in this ecotone are *Festuca caprina*, *Merxmuellera disticha*, *M. drakensbergensis*, *Pentaschistis oreodoxa*, *P. natalensis* and *P. galpinii* of *Alpine Grassland* and *Themeda triandra*, *Trachypogon spicatus*, *Aristida monticola*, *Pentaschistis pilosogluma*, *Bromus leptoclados*, *Helictotrichon turgidulum*, *Melica racemosa*, *Brachypodium bolusii* and *Festuca costata* var. *costata* of *Themeda triandra*—Temperate Grassland as well as *Koeleria cristata*, *Harpochloa falx*, *Anthoxanthum ecklonii* and *Agrostis barbuligera*, which are common to both, and *Festuca killickii*, which seems specific to this ecotone. Among the forbs are *Helichrysum drakensbergense*, *Fumaria officinalis*, *Harveya coccinea*, *Senecio macrospermus*, *Cephalaria galpiniana*, *Dichilus lebeckioides*, *Kniphofia northiae*, *R. ritualis*, *Wahlenbergia lobulata*, *Glumicalyx goseloides*, *Bupleurum mundii*, *Pimpinella caffra*, *Scabiosa columbaria*, *Luzula africana*, *Athrixia fontana*, *Berkheya macrocephala*, *B. multijuga*, and *Dianthus basuticus* var. *grandiflorus*.

2.2 *Subalpine Fynbos*

This community, in modern terminology better described as Subalpine Heath, contains the following dominants: the attractive, yellow-flowered *Euryops tysonii* (Fig. 14), *Lotononis trisegmentata* and *Erica algida* (Fig. 15). Associated with these species are *Buchenroedera lotononoides*, *Helichrysum tenuifolium* and *Polemannia montana*.

FIG. 14.—*Euryops tysonii* Fynbos or Heath situated in the Sani Pass.

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UITTREKSEL

Die plantegroei van die Sanipas-gebied in die suidelike Drakensberge tussen 2 600 en 3 260 m word kortliks beskryf en illustreer. Lugtemperatuur en reënvalgegewens word voorsien. Daar word verwys na die

FIG. 15.—*Erica algida* Fynbos or Heath in the Sani Pass. At bottom right is the grey form of *Helichrysum trilineatum*.

teenwoordigheid van Themeda triandra-*grasveld op die kruin van die Drakensberge by Ngwangwana pas* (*Thamatuwepas*), *sowat* 30 *km suid van Sanipas.*

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