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AN ACCOUNT OF THE PLANT ECOLOGY OF THE HAWAAN FOREST, NATAL†

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ABSTRACT

The location, physiography and climate of the Hawaan Forest, Natal, are given. The general ecology of the forest margin and climax forest, with special reference to structure, composition and density of trees and shrubs from 50 random sample sites, and gap succession is outlined. A preliminary checklist of angiosperms occurring in Hawaan is appended.

INTRODUCTION

The Hawaan forest is a relic patch of climax dune forest occurring in Acocks's (1953) Coastal Tropical Forest Type. It is situated 10 miles north of Durban at the intersection of co-ordinates 29°42′ south and 31°06 east.

The area is approximately 100 acres in extent and is owned by the Natal Estates (Pty.) Ltd., who have effectively protected it since the turn of the century. It is bounded on the east by the National Highway, on the north by the Mhlanga River and on the remaining sides by sugarcane fields or abandoned farm lands (Plate 1).

PHYSICAL FACTORS

Physiography

The forest extends from 50 to 200 ft. above sea level on stabilised sand dunes. The soil is sandy and deep.

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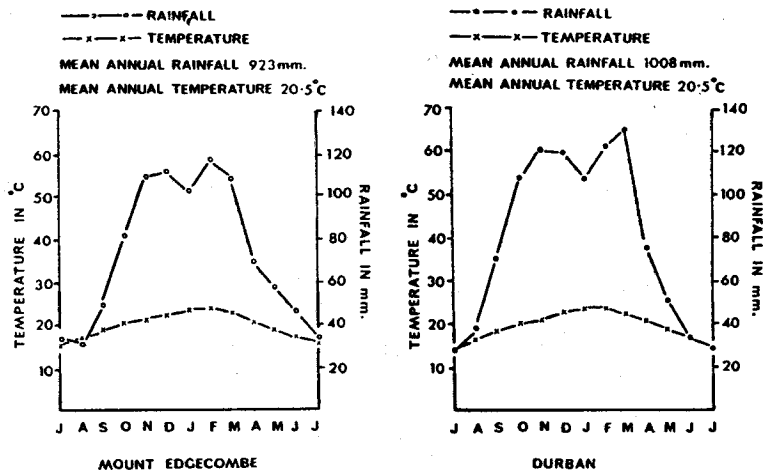


FIG. 2.
Summarized climatic data for Durban and Mt. Edgecombe.

VEGETATION

Forest margin

The forest margin is not well developed because the forest has been damaged on all sides, except on the north adjacent to the river (Plate 2).

Where the forest has been encroached upon by sugarcane lands there is a luxuriant growth of marginal trees and lianes which form an effective barrier to light and wind penetration beneath the canopy. Common trees colonizing such areas are *Sapium integerrimum, Allophylus natalensis, Albizia adianthifolia, Ziziphus mucronata* and *Brachylaena discolor*. Common lianes are *Grewia caffra, Scutia myrtina, Acacia kraussiana* and *Dalbergia armata*.

On the seaward side, however, where a National Highway has been carved through the forest, the margin has not become overgrown due to the killing of exposed trees and seedlings by the wind-carried salt-spray. The first and sometimes the second line of trees, exposed when the road was cut through the forest some 5 years ago, have been killed by exposure to salt spray (Plate 3). Common species on this margin are shrubs such as *Peddiea africana, Uvaria caffra, Carissa bispinosa, Chrysanthemoides monilifera* and the grass, *Panicum chusqueoides*. Few lianes are present and in some more sheltered parts trees such as *Deinbollia oblongifolia, Euclea natalensis,* and *Croton sylvaticus* are found.

PLATE 2.
Hawaan forest, as seen from the Mhlanga River, showing the only undamaged margin and the fairly even canopy.

PLATE 3.
The destruction caused by salt spray to the section of forest cleared for the National Road.

Climax forest

The Hawaan forest is considered to be climax forest as there is no direct evidence of exploitation apart from the removal of dead branches for firewood and the very occasional cutting of trees.

There are three distinct forest facies which are related to the topography and aspect.

a) Structure. The forest on the flat and on the seaward slope comprises four strata: canopy, sub-canopy, shrub and herbaceous field layer. The forest on the river slope has three strata: canopy, shrub and herbaceous field layer. The numerous lianes present throughout are a feature of Natal dune forest.

The height of the continuous upper canopy is variable and on the flat and seaward slopes may be from 30 to 60 ft high (Figs. 3 & 4), while on the river slope the canopy is shorter, from 20 to 40 ft high.

The sub-canopy tree layer is discontinuous and not well developed; trees vary in height from 10 to 40 ft.

The shrub layer, from two to eight feet high, is discontinuous and is best developed on the flat ground where an almost continuous layer is formed. On the seaward slope the shrub layer is poorly developed and on the steep river slope the shrub layer is sparse, except where the canopy is broken.

The herbaceous field layer is sparse throughout, particularly on the river slope where the forest-floor is almost bare.

Lianes are common throughout, although most abundant on the seaward and river slopes. They increase the density of the canopy considerably and effectively seal off small gaps. Very rarely is the weight of lianes sufficient to cause mechanical breakage of branches, as is the case in forests further inland (Moll, 1965).

A feature of Hawaan is that many canopy trees are not upright (Plate 4). Once a tree-crown reaches the canopy and is subjected to gusty winds, the poor anchorage provided by the sandy soil often results in the tree being blown out of the vertical. As the direction of gusty winds is inconsistent, angle of lean is variable. The only canopy tree species which is always erect is *Celtis africana* and this may be attributed to the well-developed spur buttresses.

An important factor affecting the forest structure is the high erodibility of the sandy soil, particularly on the steep slopes which do not offer a stable substrate for seedling germination. This area is subject to sheet erosion causing root systems to be exposed (Plate 5); on such areas the forest is short and dense, comprising mainly pioneer species.

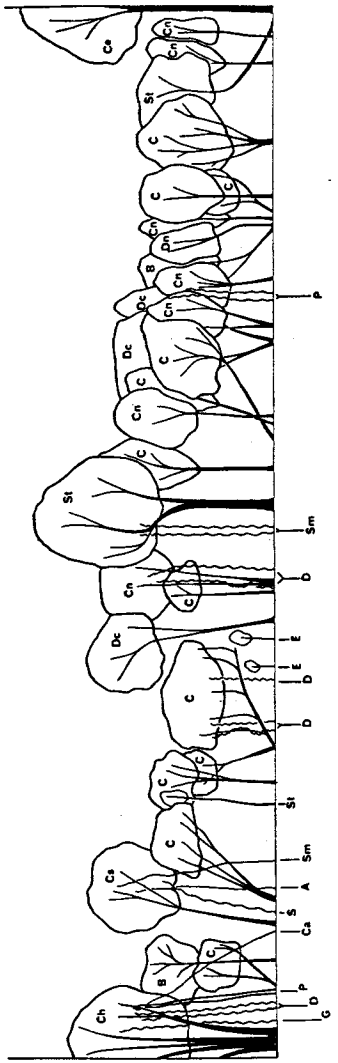
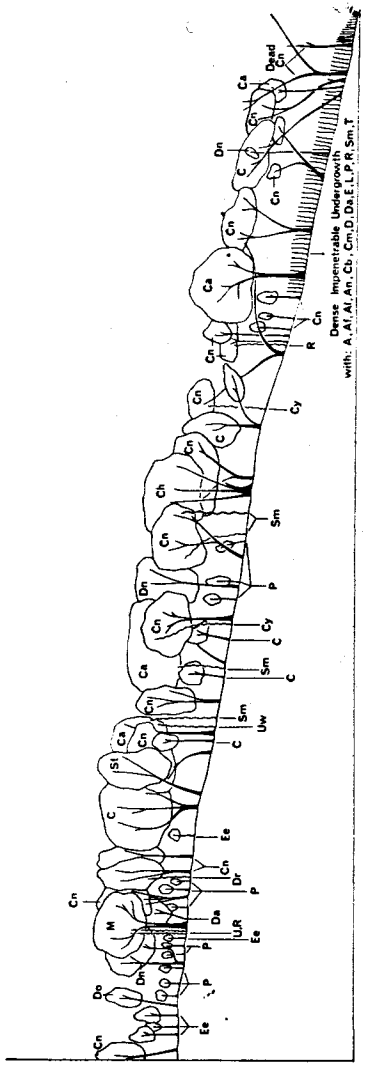


Fig. 3.
Profile diagram (belt 200 x 25 ft) through climax forest.



A	Acacia kraussiana	Cp	Capparis brassii	L	Lantana camara
Af	Asparagus falcatus	Cy	Cyphostemma hypoleuca	M	Mimusops obovata
Al	Allophylus natalensis	D	Dovyalis sp.	P	Peddiea africana
An	Acridocarpus natalitius	Da	Drypetes arguta	R	Rhoicissus rhomboidea
C	Cavacoa aurea	Dn	Drypetes natalensis	S	Saplum integerrimum
Ca	Celtis africana	Do	Deinbollia oblongifolia	Sm	Scutia myrtina
Cb	Cariasa bispinosa	Dr	Dalbergia armata	St	Strychnos innocua
Ch	Chaetachme aristata	E	Eupatorium odoratum	T	Teclea natalensis
Cm	Chrysanthemoides monilifera	Ee	Erythroxylum emarginatum	U	Uvaria caffra
Cn	Cola natalensis	G	Psychotria capensis	Uw	Urera woodii
		Gg	Garcinia gerrardii		

FIG. 4.
Profile diagram (belt 300 x 25 ft) through the forest on the sea slope, showing a section from the disturbed margin into sub-climax forest.

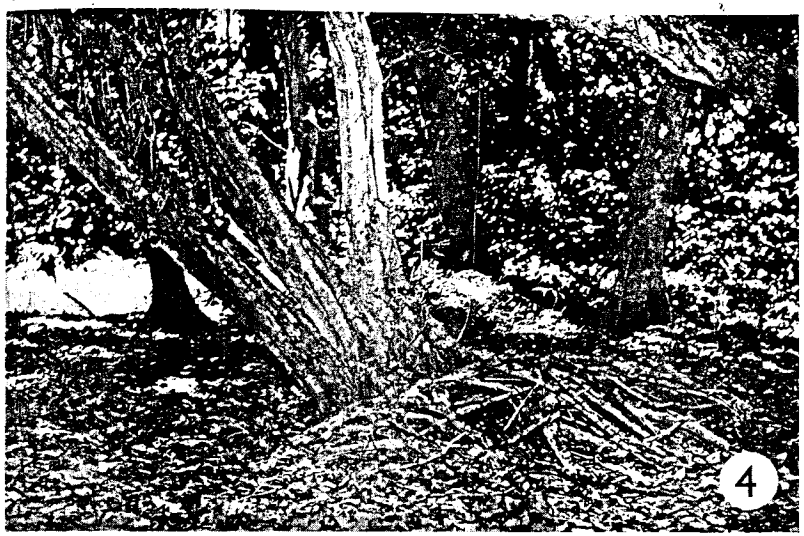


PLATE 4.
An example of the sandy soil offering poor anchorage is this specimen of *Cavacoa aurea*. The roots exposed on the right were lifted from the soil when the tree was shifted.

PLATE 5.
Illustrating the highly erodible soil which on the steep slopes is readily washed away exposing a mass of roots. Note the *Xylotheca kraussiana* (centre left) which appears propped up on its roots.

b) Composition. Density values for trees and shrubs, counted as the number of stems per plot, were collected from fifty 33 ft square plots (a 10% sample). These data were also converted to frequency data on the basis of the 33 ft square plots. Presence or absence of selected herbaceous species was also noted. The plots were located by restricted randomization; a grid being placed over the forest and three plots located within each grid square using random co-ordinates. Trees with a diameter at breast height (D.B.H.) of more than three inches and over 15 ft high were counted as canopy trees, all other woody plants being considered shrubs (lianes excluded). Additional data recorded were D.B.H. and height of canopy trees. All these data have been summarized and are shown in tables 1—5.

TABLE 1.
Mean density per acre of common trees and their local frequency, expressed as a percentage, in Hawaan forest

Species	12 River Plots		12 Sea Plots		26 Flat Plots		Total 50 Plots	
	Den. Acre	% Freq.	Den. Acre	% Freq.	Den. Acre	% Freq.	Den. Acre	% Freq.
Cola natalensis	46	34	134	92	135	85	111	74
Xylotheca kraussiana var. *glabrifolia*	134	92	17	25	0	0	36	28
Cavacoa aurea	9	17	25	17	42	50	30	34
Celtis africana	29	50	0	0	14	23	14	24
Drypetes natalensis	21	42	29	50	2	4	13	24
Teclea natalensis	4	8	46	34	2	4	13	12
Dovyalis sp.	21	34	4	8	12	20	12	20
Strychnos innocua	4	8	9	8	17	27	12	18
Deinbollia oblongifolia	38	59	9	17	0	0	11	18
Mimusops obovata	17	34	25	42	0	0	10	18
Strychnos decussata	4	8	0	0	14	27	8	16
Diospyros natalensis	17	34	9	17	2	4	7	14
Chaetachme aristata	9	8	17	34	0	0	6	10
Croton sylvaticus	0	0	4	8	8	16	5	10
Sapium integerrimum	13	17	0	0	4	4	5	6
Euclea natalensis	9	17	0	8	2	4	4	8
Olea capensis	4	8	9	17	2	4	4	8
Ziziphus mucronata	4	8	9	17	0	0	4	6
Average No. of stems/acre	380		350		250		350	

(i) *Trees.* Hawaan is characterized by the importance of *Cola natalensis* and *Cavacoa aurea* in the canopy. Both species have a high density, but occur predominantly on the flat and sea-facing slopes. The third most abundant tree, *Xylotheca kraussiana*, occurs almost entirely on the river-facing slope. Hawaan is unique in the Republic of South Africa as no other similar forest types have such an abundance of *Cola natalensis* and *Cavacoa aurea*. The latter is particularly rare and has been found in only one other place, the Dukuduku forest at St. Lucia, where it occurs in a very small localized patch.

Average density per plot shows that the flat area has lowest density and the river aspect highest density. Observations suggest that the flat area is a true climax stage and that the sea and the river slopes are seral stages (or sub-climax stages).

From the frequency values *Cola natalensis*, *Cavacoa aurea*, *Celtis africana*, *Dovyalis* sp. (E.J.M. 1837), *Strychnos innocua* and *Strychnos decussata* are the most important climax trees. On the sea slope *Xylotheca kraussiana*, *Drypetes natalensis*, *Teclea natalensis*, *Mimusops obovata* and *Chaetachme aristata* are the most common sub-climax species, while on the river slope *Xylotheca kraussiana*, *Drypetes natalensis*, *Deinbollia oblongifolia*, *Mimusops obovata* and *Diospyros natalensis* are the most common sub-climax trees.

Data for average D.B.H. and average height of trees (Table 2) indicate that the largest trees occur on the flat ground and the smallest trees on the river slope.

TABLE 2.
Average, estimated D.B.H. and Height of trees in Hawaan forest

	River Slope	Sea Slope	Flat Ground
D.B.H. in inches	4·5	5·0	8·0
HEIGHT in feet	19	23	28

(ii) *Shrubs.* Shrubs are numerous in Hawaan and only the most common are given in Table 3.

TABLE 3.
Mean density per acre of the principal shrubs and their local frequency, expressed on a percentage, in Hawaan forest

Species	12 River Plots		12 Sea Plots		26 Flat Plots		Total 50 Plots	
	Den. Acre	% Freq.	Den. Acre	% Freq.	Den. Acre	% Freq.	Den. Acre	% Freq.
Notobuxus natalensis	4	8	9	8	623	43	327	26
Uvaria caffra	288	84	188	100	383	97	313	94
Drypetes natalensis	46	59	204	92	198	85	162	80
Acridocarpus natalitius	25	8	134	34	225	70	156	46
Drypetes arguta	38	42	54	42	225	89	141	66
Erythroxylum emarginatum	129	84	117	59	163	85	141	78
Cola natalensis	4	8	117	50	204	66	135	48
Baphia racemosa	146	67	179	67	62	85	134	76
Dovyalis sp.	100	42	63	50	97	73	88	60
Diospyros natalensis	125	42	109	67	54	50	84	52
Peddiea africana	4	8	175	84	40	43	64	44
Carissa acuminata	46	50	54	67	44	35	47	46
Putterlickia verrucosa	42	42	79	59	32	20	45	34
Grewia occidentalis	50	34	67	17	15	20	36	22
Dracaena hookeriana	17	17	100	42	10	8	32	18
Cassine papillosa	42	34	9	17	21	9	21	30
Average No. of stems/acre	1200		1655		2390		1925	

Notobuxus natalensis has the highest recorded density yet it has a low percentage frequency. It always occurs in localized patches, usually to the exclusion of all other shrub and herb species.

Shrub density and frequency data are much higher than the tree data and the shrubs are most dense on the flat area, apparently due to recent disturbance. The shrubs on the river slope have the lowest density because of the steep slope and highly erodible soil.

The shrub frequency data show a pattern associated with site aspect, although it is not as distinct as that shown by the canopy trees, as shrubs are more dependant on canopy density and the amount of disturbance than on the external environment. *Baphia racemosa*, *Uvaria caffra*, *Erythroxylum emarginatum* and *Drypetes natalensis* are more or less ubiquitous while *Acridocarpus natalensis* and *Drypetes arguta* are most common in the flat plots. *Cola natalensis*, *Dovyalis* sp. (E.J.M. 1837) and *Diospyros natalensis* are most common on the sea and flat slopes. *Peddiea africana* and *Putterlickia verrucosa* are most common on the sea-facing slopes and *Carissa acuminata* occurs mainly on the river slope.

(iii) *Herbs*. Only the more common herbs were recordea as being either present or absent. These data are given in Table 4.

TABLE 4.
Local frequency of the most common herbaceous species in Hawaan forest

Species	Percentage Frequency			
	12 River Plots	12 Sea Plots	26 Flat Plots	Total 50 Plots
Panicum chusqueoides	100	92	73	84
Oplismenus hirtellus	8	84	97	72
Cyperus albostriatus	42	67	43	48
Cyphostemma hypoleuca	92	25	34	36
Eriospermam natalensis	8	67	75	36
Achyranthus aspera	34	8	23	22
Commelina sp.	25	25	8	16

Oplismenus hirtellus and *Eriospermum natalensis*, being climax forest herbs, are most common on the sea and flat sites. *Panicum chusqueoides*, a secondary species, is an indicator of recent disturbance.

(iv) *Lianes*. Lianes, being very common in Hawaan, are important ecologically as they add greatly to the density of the canopy. Numerous species are present yet their distribution in relation to aspect of sites is not clear (Table 5). *Dalbergia armata*, though ubiquitous, occurs mainly on the river and sea slopes. *Acacia kraussiana* and *Capparis* spp. occur mainly on the river slopes. *Behnia reticulata*, *Rhoicissus rhomboidea* and *Scutia myrtina* are most common on the sea slope and *Cyphostemma hypoleuca* is most frequent on the sea and flat slopes.

TABLE 5.
Local frequency of lianes in Hawaan forest

Species	Percentage Frequency			
	12 River Plots	12 Sea Plots	26 Flat Plots	Total 50 Plots
Dalbergia armata	83	42	70	62
Acacia kraussiana	75	42	43	50
Capparis spp.	75	42	31	42
Secamone spp.	42	34	43	40
Behnia reticulata	0	75	39	36
Cyphostemma hypoleuca	17	50	43	34
Adenia hastata	33	25	35	32
Asparagus falcatus	17	25	39	30
Rhoicissus rhomboidea	17	42	27	28
Scutia myrtina	25	59	8	24
Rhoicissus tomentosa	17	17	23	20
Asparagus plumosus	8	0	35	20
Flagellaria guineensis	33	17	8	16
Rhoicissus cuneifolius	0	34	16	16
Uvaria caffra	0	17	20	14
Popowia caffra	0	17	12	10
Urera woodii	0	8	16	10
Dalbergia obovata	8	0	4	4
Grewia caffra	0	0	4	2

c) *Gap Succession*. Gaps in the forest canopy are not common in Hawaan but once a gap forms it is rapidly filled by a growth of shrubs such as *Uvaria caffra*, *Baphia racemosa* and *Deinbollia oblongifolia*. Tree saplings are also common, especially *Cola natalensis*, *Croton sylvaticus* and *Ziziphus mucronata*. Lianes grow luxuriantly in the gaps, particularly *Dalbergia armata* and *Rhoicissus* spp. Old gaps which have subsequently closed over are marked by the increased local density of shrubs and lianes which are eventually shaded out.

DISCUSSION AND CONCLUSIONS

Hawaan is a comparatively well protected, unique area of forest north of Durban. The general ecology of the species is related to three topographically distinct aspects. The forest on the river and sea aspects are considered as seral to that on the flat area which is considered as climax forest.

The tabulated data collected from 50 random plots were subjectively sorted into three groups related to plot-aspect. By scanning the tables certain ecological preferences of some species could be seen and it was possible to conclude that *Cola natalensis*, *Cavacoa aurea*, *Celtis africana*, *Dovyalis* sp. (E.J.M. 1837) and *Strychnos innocua* were climax tree species, while *Xylotheca kraussiana*, *Drypetes natalensis*, *Teclea natalensis*, *Deinbollia oblongifolia* and *Mimusops obovata* were sub-climax species. Similar conclusions were possible

concerning shrubs, herbs and, to some degree, lianes. The method was totally subjective yet functioned extremely well due to the three distinct facies represented at Hawaan.

Acknowledgements

I am very grateful to Natal Estates (Pty.) Ltd. for permission to work in the area, to Mr. J. W. Morris for many valuable comments and to the Chief, Botanical Research Institute and Secretary, Agricultural Technical Services for permission to publish this report.

Preliminary Checklist of Angiosperms

Genera of angiosperms have been arranged according to Phillips's Genera of South African Flowering Plants (1951), and species within genera have been listed alphabetically. Numbers are my collectors numbers and specimens are housed in the National Herbarium, Pretoria, with duplicates in the Natal University Herbarium, Pietermaritzburg.

GRAMINEAE
Panicum chusqueoides Hack. . . 2981, 2983, 3094
P. deustum Thunb. 3114
P. laticomum Nees 2991
P. maximum Jacq. . . . . seen only
Digitaria diversinervis (Nees) Stapf . 3142, 3196
Setaria verticillata (L.) Beauv. 2988
Dactyloctenium australe Steud. 3112
CYPERACEAE
Cyperus albostriatus Schrad. . . . . seen only
Mariscus dregeanus Kunth 3119
FLAGELLARIACEAE
Flagellaria guineensis Schumach. . . . seen only
COMMELINACEAE
Commelina benghalensis L. 1792
LILIACEAE
Chlorophytum modestum Bak. 3138
Asparagus falcatus L. 1829
A. plumosus Bak. 1796, 3121
Behnia reticulata Didr. 1815
Haemanthus magnificus Herb. 1823
ORCHIDACEAE
Microcoelia exilis Lindl. 3124
Mystacidium capense Bol. 1811
M. flanaganii (L.f.) Schltr. 2845, 3273
ULMACEAE
Celtis africana Burm. f. 1838, 3088, 3225
MORACEAE
Ficus burtt-davyi Hutch. . . . . seen only
F. polita Vahl . . . . . seen only
URTICACEAE
Urera woodii N.E. Br. 2412, 3137
LORANTHACEAE
Loranthus kraussiana Meisn. 2422
AMARANTHACEAE
Celosia trigyna L. 3143, 3204
Cyathula cylindrica Moq. 2982, 3098
Pupalia lappacea (L.) Juss. . . . . seen only
Psilotrichum africanum Oliv. . . . . seen only
Achyranthus aspera L. 3115, 3149
NYCTAGINACEAE
Commicarpus pentandrus (Burch.) Heim. . . 3099
PHYTOLACCACEAE
Rivinia humilis L. 3117
MENISPERMACEAE
Tinospora caffra (Miers) Troupin . . . seen only
ANNONACEAE
Uvaria caffra E. Mey. ex Sond. . . 2987, 3125
Artabotrys monteiroi Oliv. . . . . seen only
CRUCIFERAE
Heliophila scandens Harv. 1806
CAPPARIDACEAE
Capparis bassii DC. 1795, 8219
C. citrifolia Lam. 3193, 3215
C. tomentosa Lam. . . . . seen only
C. zeyheri Turcz. 3224
Capparis sp. 3215
Maerua racemulosa (A. DC.) Gilg & Ben. 1799, 3253
LEGUMINOSAE
Albizia adianthifolia (Schum.) W. F. Wright . 1828
Acacia kraussiana Meisn. 2998
Dichrostachys cinerea (L.) Wight & Arn. subsp. *forbesii* (Benth.) Brenan & Brumitt . . . 3123
Baphia racemosa Hochst. 2401, 2404, 2419, 3089, 3220
Dalbergia armata E. Mey. 1794
ERYTHROXYLACEAE
Erythroxylum emarginatum Thonn. . 1814, 1830, 2395, 2405
Nectaropetalum zuluensis (Schonl.) Corbishley 1800

RUTACEAE
Teclea gerrardii Verdoorn 3087
T. natalensis (Sond.) Engl. . . . 2423, 2984, 3134
MELIACEAE
Turraea floribunda Hochst. . . . . seen only
T. obtusifolia Hochst. 3110
MALPIGHIACEAE
Acridocarpus natalitius Juss. 2403
EUPHORBIACEAE
Tapura fischeri Engl. 3217
Drypetes arguta Hutch. 2394
D. natalensis Hutch. 1835, 2414
Cavacoa aurea (Cavaco) J. Leon. . . 2397, 2418, 2421, 3206
Croton sylvaticus Hochst. 1797
Micrococca capensis Prain 3133
Erythrococca berberidea Prain 3277
Acalypha glabrata Thunb. 2992
A. sonderiana Mull. Arg. 3101
Suregada africana (Sond.) Kuntze 2413, 2415, 3127
Sapium integerrimum (Hochst. ex Krauss). J. Leon 1821, 2979, 3194, 3208
Synadenium cupulare (Boiss.) Wheeler . . 3111
BUXACEAE
Notobuxus natalensis Oliv. 1836, 2410
ANACARDIACEAE
Rhus natalensis Bernh. 1818, 2989
R. nebulosa Schonl. 3221
CELASTRACEAE
Maytenus undata (Thunb.) Blakelock . . . 3201
M. procumbens (L.f.) Loes 3270
Putterlickia verrucosa (E. Mey. ex Sond.) Szyszyl 1802
Cassine laurifolium (Harv.) Davison . . . 3126
C. papillosa (Hochst. ex Krauss) Kuntze 2411, 2985 3102, 3198
HIPPOCRATEACEAE
Hippocratea schlechteri Loes. var. *peglerae* Loes. 3271
SAPINDACEAE
Allophylus natalensis (Sond.) De Winter 1803, 3222
A. melanocarpus (Sond.) Radlk. 3129
Deinbollia oblongifolia (Sond.) Radlk. . . 1798
MELIANTHACEAE
Bersama lucens (Hochst.) Szyszyl. 3109
RHAMNACEAE
Ziziphus mucronata Willd. 2408, 2993
Scutia myrtina (Burm. f.) Kurz . . seen only
VITACEAE
Rhoicissus rhomboidea (E. Mey. ex Harv.) Planch. 1812, 3092
R. tomentosa (Lam.) Wild & Drummond . 3122
Cyphostemma sp. cf. *cirrhosum* (Thunb. Descoings subsp. *transvaalensis* (Szyszyl.) Wild & Drummond 3095
TILIACEAE
Grewia caffra Meisn. 2997, 3192
G. occidentalis L. . . . . seen only
MALVACEAE
Abutilon grantii A. Meeuse 1801
STERCULIACEAE
Cola natalensis Oliv. 1810, 2396, 2399, 2402, 3211
OCHNACEAE
Ochna natalitia (Meisn.) Walp. 3139
GUTTIFERAE
Garcinia gerrardii Harv. 3199
FLACOURTIACEAE
Xylotheca kraussiana Hochst. var. *glabrifolia* Wild 3089, 3120
Dovyalis sp. 1837, 2986, 3099
D. rhamnoides (Burch.) Harv. 2996
PASSIFLORACEAE
Adenia gummifera (Harv.) Harms 3096
A. hastata (Harva.) Schinz 3104
THYMELIACEAE
Peddiea africana Harv. . . . 1804, 2416, 3195
RHIZOPHORACEAE
Cassipourea gerrardii Alston . 2407, 2417, 2420, 3131, 3203
C. gummiflua Tul. . . . . seen only
MYRTACEAE
Eugenia capensis Harv. . . . . seen only
MYRSINACEAE
Embelia ruminata (E. Mey. ex A. DC.) Mez . 1827
SAPOTACEAE
Sideroxylon inerme L. 3097
Mimusops caffra E. Mey. ex A. DC. . . seen only
M. obovata Sond. 3113, 3132, 3272
EBENACEAE
Euclea natalensis A. DC. 1809
Diospyros natalensis (Harv.) Brenan . 1834, 3091
D. villosa (L.) De Winter var. *villosa* De Winter 1817
OLEACEAE
Olea capensis L. subsp. *enervis* (Harv. ex C. H. Wr.) Verdoorn 3108
O. capensis L. subsp. *macrocarpa* (C. H. Wr.) Verdoorn 3200
Jasminum streptopus E. Mey. 3275
LOGANIACEAE
Strychnos decussata (Pappe) Gilg . . 2409, 3141
S. innocua Del. subsp. *gerrardii* (N.E. Br) Verdoorn 1813, 2398, 3255
S. henningsii Gilg . . . 3093, 3140, 3278, 3281
S. usambarensis Gilg . . . . . seen only
APOCYNACEAE
Acokanthera oblongifolia (Hochst.) Codd . . 3274
Landolphia kirkii Dyer 2995
ASCLEPIADACEAE
Cynanchum ellipticum R. A. Dyer 3205
Secamone gerrardii Harv. . . . . seen only
CONVOLVULACEAE
Ipomoea sinensis (Desr.) Choisy 3218
VERBENACEAE
Lantana camara L. 1822
Clerodendrum glabrum E. Mey. . . . seen only
C. myricoides (Hochst.) Vatke 1839
SOLANACEAE
Cestrum laevigatum Schltr. 1793
SCROPHULARIACEAE
Nemesia denticulata (Benth.) Grant . . . 1824

BIGNONIACEAE
Tecomaria capensis Spach 1819
ACANTHACEAE
Thunbergia dregeana Nees 3100
Thunbergia sp. 3218
Phaulopsis imbricata (Forsk.) Sweet . . . 1825
Dicliptera heterostegia Presl. ex Nees . . seen only
D. mossambicensis Klotzsch 3213
Ruttya ovata Harv. 3276
Justicia campylostemon T. Anders. . . . 3214
J. tubulosa Lindau 3212
RUBIACEAE
Xeromphis obovata (Hochst.) Keay . . seen only
Rothmannia globosa (Hochst.) Keay . . . 1831
Tricalysia sonderiana Hiern . . 1808, 3103, 3223
Vangueria chartacea Robyns . . . . seen only
Lagynias lasiantha (Sond.) Bullock . . . 3105
Canthium ciliatum (Klotzsch) Kuntze . . . 3107
C. gueinzii Sond. 3130
C. mundianum Cham. & Schlechtd. . . . 1826
C. obovatum Klotzsch . . . 1832, 3216, 3106
C. pauciflorus (Klotzsch) Kuntze 3197
C. ventosum (L.) S. Moore . . . . . seen only
C. sp. 3197
Mitrastigma axillare Hochst. 2994
Pavetta revoluta Hochst. . . . 2990, 3128, 3135
Psychotria capensis (Eckl.) Vatke . . 1807, 3202
COMPOSITAE
Vernonia angulifolia DC. 3280
Eupatorium odoratum L. 3210
Brachylaena discolor DC. 1816, 3209
Helichrysum kraussii Sch. Bip. 1790
Chrysanthemoides monilifera (L.) T. Norl. . 179

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SOME NEW SPECIES OF ERICA†

H. A. Baker

Abstract

Species hitherto not collected are, owing to the opening up of the Forest Reserves and a revival of interest in the Genus, frequently being brought in for identification and many collected previously are as yet un-named. The following group includes some in each category. They are from the higher mountains of the Southern Cape.

Erica kougabergensis *H. A. Baker* sp. nov. (Ericaceae-Ericoideae) Pyronium.

Frutex erectus ad 45 cm. altus. *Rami* ascendentes, pubescentes, pilis paucis longioribus glandulosis admixis, glabrescentes. *Folia* 3-nata, 1·0—1·5 mm longa, patentia, imbricata, anguste ovata, sulcata, acuta vel dorsis apertis obtusis, glabra, similis bracteis et sepalis sparsim ciliata pilis setosis, glandulosis. *Flores* plerumque terminales sed aliquot subaxillares, umbelliformes, numero 3—6 varians, corollini, numerosi; pedunculi circa 2 mm longi, curvi, pubescentes pilis longioribus glandulosis admixis; bracteae approximatae, 1·5 mm longae, anguste obovatae, sulcatae. *Sepala* 1·75 mm longa, anguste ovata, apicibus sulcatis, glabra. *Corolla* 2·5 mm longa, globoso-urceolata, sicca, glabra, rosea, lobis 0·5 mm longis, leviter effusis, obtusis. *Filamenta* plana, aliquantum curva; antherae exsertae, 0·75 mm longae, laterales, oblongae, obtusae, dorsis aliquantum curvis, bipartae, marginibus scabrosis, appendiculatae; poro fere dimidio pars lobi; aristae breves, basi latae, scaberae, caduces. *Ovarium* turbinatum, glabrum; stylo multo exserto; stigmate capitato.

Cape Province. Uniondale District on the Kougaberg range. *Esterhuysen* 10797 near the Kouga Peak, Southern slopes 3000—4000 ft., 14/11/1944 (Holotype in Bolus Herbarium).

Erect shrub to about 45 cm. *Branches* ascending, villous with a few longer, gland-tipped hairs admixed, glabrescent. *Leaves* 3-nate, 1·0—1·5 mm long, spreading, imbricate, narrow-ovate, sulcate, acute to open-backed, obtuse and, like the bracts and sepals, glabrous and sparsely ciliate with gland-tipped, setose hairs. *Flowers* terminal in umbels of 3—6 flowers, a few axillary or appearing so, corolline, numerous; peduncles about 2 mm. long, curved, pubescent, with

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