

An analysis of the Flora of Natal

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ABSTRACT

The recently completed Flora of Natal (Ross, Mem. Bot. Surv. S.Afr. No. 39, 1973) is analysed numerically and a brief comparison is made with the total number of families, genera and species recorded by Bews in his Flora of Natal and Zululand (1921). A number of diagrams illustrating the proportional representation of certain elements of the Flora are provided. The families whose species constitute more than 0,5% of the total number of species in Natal, and those genera containing 15 or more species, are tabulated. The marked inverse relationship between numbers of genera and families is illustrated. Brief mention is made of some of the elements contributing to the richness of the flora.

Natal is the smallest of the four provinces, its 91 385 square kilometres amounting to only 8% of the area of the Republic of South Africa. However, despite its size, the province has a rich flora as revealed by the recently completed Flora of Natal (Ross, Mem. Bot. Surv. S. Afr. No. 39, 1973).

The Flora of Natal (Ross, l.c.) accounts for 179 families, 1238 genera and 4826 species (these figures exclude Pteridophytes and Bryophytes). These figures compare with the 148 families, 901 genera and 3786 species recorded by Bews in his Flora of Natal and Zululand (1921). Therefore, in the fifty years that have elapsed since Bews published his work, an additional 32 families, 337 genera and 1 040 species have been recorded from Natal. With the continued tendency in taxonomy to divide families it would be unwise to place too much emphasis on the increase in the number of families when comparing the present figures with those recorded by Bews. Of the 32 additional families not recorded by Bews (Bews regarded Hippocrateaceae as a distinct family but it is now included in Celastraceae), 13 are new records for Natal while the remaining 19 are the consequence of existing families being fragmented into new smaller families. For example, the plants included in Liliaceae by Bews are now placed in Liliaceae, Agavaceae and Smilacaceae. The 13 new families recorded from Natal are: Ruppiaceae, Zannichelliaceae, Najadaceae, Alismataceae, Pontederiaceae (introduced, but naturalized), Casuarinaceae (introduced, but naturalized) Balanophoraceae, Basellaceae, Vahliaceae, Dichapetalaceae, Elatinaceae, Canellaceae and Turneraceae.

Of the 179 families, 4 families (2,24%) are gymnosperms and 175 (97,76%) are angiosperms. Of these angiosperm families, 34 (19,40%) are monocotyledons and 141 (80,60%) are dicotyledons (see Fig. 1).

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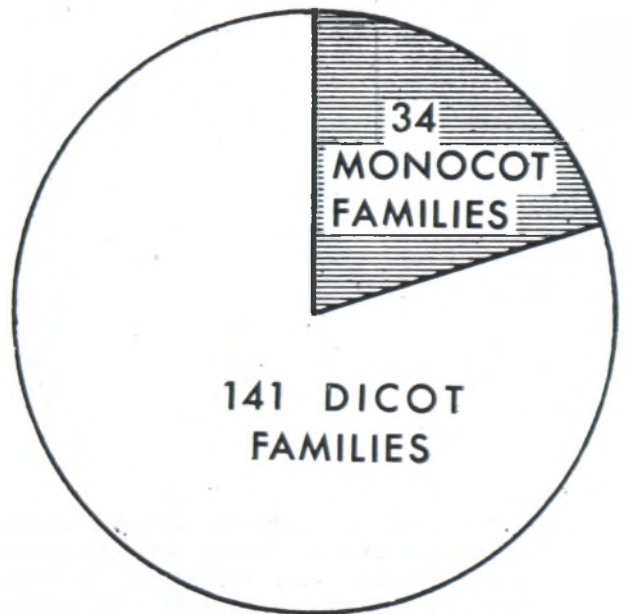


FIG. 1.—Proportional representation of monocotyledon families and dicotyledon families in the Flora of Natal.

Of the 4 826 species recorded, 14 (0,29%) are gymnosperms and 4 812 (99,71%) are angiosperms. Of these 4 812 angiosperm species, 1 308 (27,16%) are monocotyledons and 3 504 (72,84%) are dicotyledons (see Fig. 2). The families whose species contribute more than 0,5% of the total number of species are listed in order of numerical importance in Table 1. The number of genera present in these families is also reflected in Table 1 but as family position is determined by the total number of species, the arrangement of genera follows no strict sequence.

TABLE 1.—Synopsis of the Natal families whose species comprise more than 0,5% of the total number listed in order of numerical importance, together with the number of genera in each family.

Family	No. of species	No. of species expressed as a % of the total	No. of genera	No. of genera expressed as a % of the total
Compositae.....	549	11,37	112	9,05
Leguminosae.....	420	8,70	89	7,19
Poaceae.....	414	8,57	137	11,07
Liliaceae.....	230	4,77	36	2,91
Asclepiadaceae.....	207	4,29	31	2,50
Orchidaceae.....	205	4,25	41	3,31
Cyperaceae.....	175	3,63	22	1,78
Euphorbiaceae.....	146	3,03	36	2,91
Rubiaceae.....	132	2,74	45	3,63
Scrophulariaceae.....	127	2,63	34	2,75
Lamiaceae.....	117	2,42	27	2,18
Acanthaceae.....	108	2,24	27	2,18
Iridaceae.....	91	1,89	14	1,13
Campanulaceae.....	73	1,51	7	0,57
Crassulaceae.....	68	1,41	3	<0,5
Malvaceae.....	60	1,24	13	1,05
Convolvulaceae.....	52	1,08	13	1,05
Amaryllidaceae.....	52	1,08	9	0,73
Solanaceae.....	52	1,08	8	0,65
Apiaceae.....	49	1,02	22	1,78
Geraniaceae.....	43	0,89	4	<0,5
Verbenaceae.....	41	0,85	13	1,05
Anacardiaceae.....	41	0,85	10	0,81
Thymelaeaceae.....	40	0,83	10	0,81
Cucurbitaceae.....	36	0,75	14	1,13
Brassicaceae.....	35	0,73	15	1,21
Polygalaceae.....	35	0,73	2	<0,5
Sterculiaceae.....	33	0,68	6	<0,5
Selaginaceae.....	33	0,68	3	<0,5
Amaranthaceae.....	32	0,66	14	1,13
Ericaceae.....	32	0,66	2	<0,5
Celastraceae.....	29	0,60	10	0,81
Gentianaceae.....	29	0,60	6	<0,5
Mesembryanthemaceae	29	0,60	4	<0,5
Polygonaceae.....	27	0,56	5	<0,5
Santalaceae.....	27	0,56	5	<0,5
Boraginaceae.....	26	0,54	9	0,73
Capparaceae.....	26	0,54	8	0,65
Hypoxidaceae.....	26	0,54	3	<0,5
Apocynaceae.....	25	0,52	13	1,05
Rosaceae.....	25	0,52	8	0,65
Tiliaceae.....	25	0,52	4	<0,5

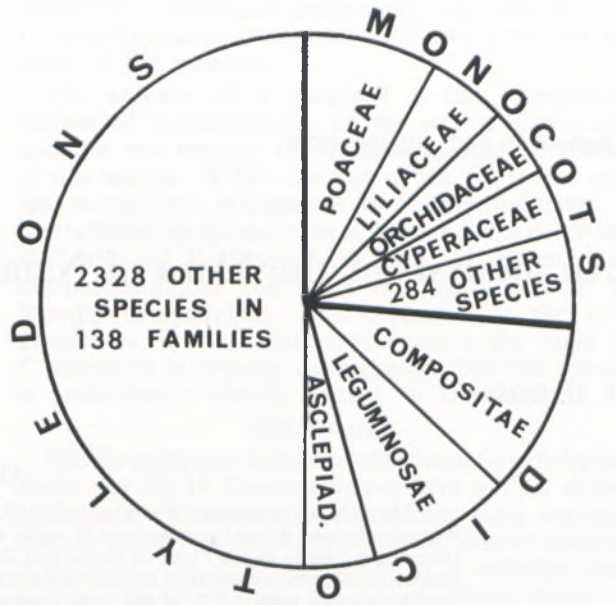


FIG. 2.—Proportional representation of angiosperm species in families with more than 175 species each.

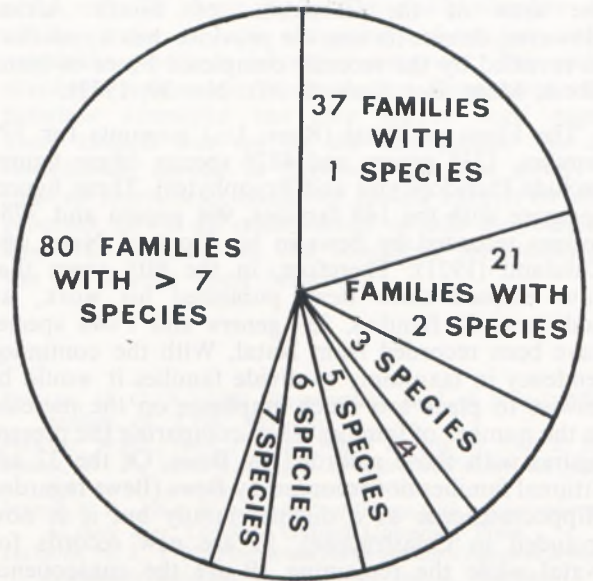


FIG. 3.—Proportional representation of families with seven or fewer species each.

The largest family is Compositae with 549 species (11,37%) followed by Leguminosae with 420 species (8,70%) and Poaceae with 414 species (8,57%). These three largest families contribute 1 383 species or 28,64% of the total number of species in Natal, while the ten largest families contribute 2 605 species or 53,98% of the total. The proportional representation of angiosperm species in families with over 175 species each in the Flora of Natal is shown in Fig. 2.

Thirty-seven families (20,67%) in Natal are represented by only one species, 21 families by two species, 13 families by three species, three families by four species, nine families by five species, 11 families by six species and five families by seven species. Only 80 of the 179 families in Natal have more than seven species. This proportional representation of the angiosperm families with seven or fewer species each is shown in Fig. 3.

Of the 1 238 genera, 4 (0,32%) are gymnosperms and 1 234 (99,68%) are angiosperms. Of these 1 234 angiosperm genera, 314 (25,45%) are monocotyledons and 920 (74,55%) are dicotyledons (see Fig. 4).

Although Compositae has by far the largest number of species, Poaceae has the largest number of genera. Poaceae with 137 genera (11,07%), Compositae with 112 genera (9,05%) and Leguminosae with 89 genera (7,19%) contribute 338 genera or 27,31% of the total number of genera. The ten largest families contribute 588 genera or 47,10% of the total number of genera. The proportional representation of angiosperm genera in families with over 34 genera each is shown in Fig. 4.

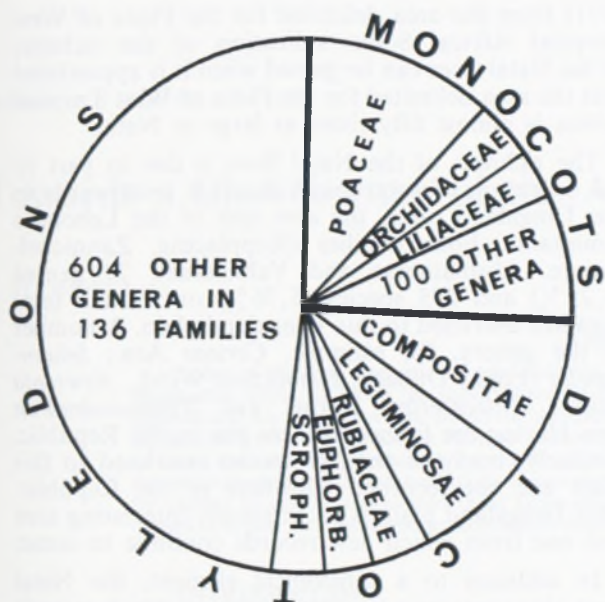


FIG. 4.—Proportional representation of Angiosperm genera in families with more than 34 genera each.

Sixty-eight families (37,99%) in Natal are represented by only one genus, 29 families by two genera, 13 families by three genera, 13 families by four genera, 12 families by five genera and four families by six genera. Only 44 of the 179 families in Natal have more than six genera. The proportional representation of the angiosperm families with five or fewer genera each is shown in Fig. 5.

This marked inverse relationship between the number of genera and families is shown in Fig. 6. It is quite apparent from this figure that most families have few genera and only very few families have

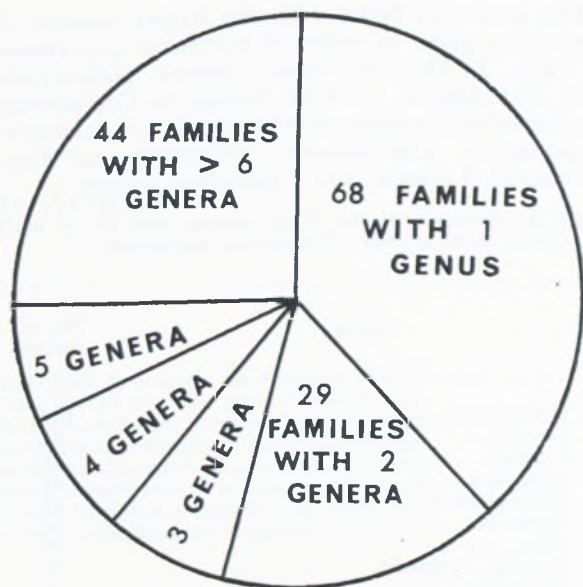


FIG. 5.—Proportional representation of families with five or fewer genera each.

many genera. A similar inverse relationship exists between the number of species and genera.

The ratio of genera to species in Natal is 1: 3,89 which implies a high proportion of genera with only one or two species. This figure for Natal is intermediate between the ratio of 1: 3,52 for the Flora of South West Africa (calculated from the figures supplied by Merxmuller in Mitt. Bot. Munchen 10: 75, 1971) and the ratio of 1: 4,21 for the revised edition of the Flora of West Tropical Africa (calculated from the figures supplied by Hepper, l.c.: 25).

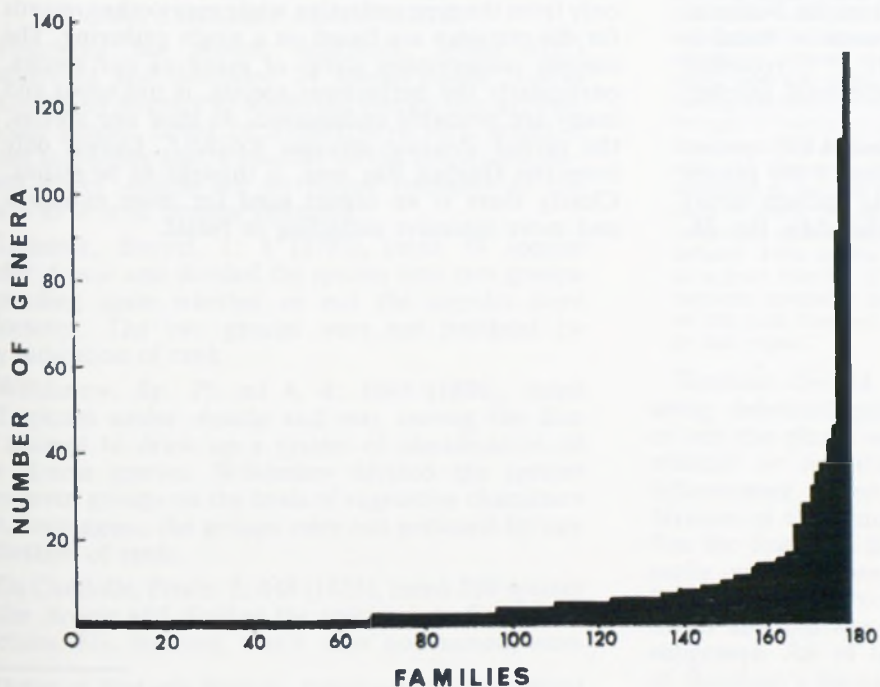


FIG. 6.—Histogram showing the marked inverse relationship between number of genera and families.

The genera in Natal with the largest number of species are given in order of numerical importance in Table 2. The two largest genera, *Helichrysum* Mill. and *Senecio* L., both belong to Compositae, but thereafter a number of other families, for example, Crassulaceae, Leguminosae, Asclepiadaceae, Euphorbiaceae, Liliaceae and Cyperaceae feature.

TABLE 2.—Synopsis of the Natal genera with 15 or more species listed in order of numerical importance.

Genus	No. of species
1. <i>Helichrysum</i>	109
2. <i>Senecio</i>	92
3. <i>Crassula</i>	55
4. <i>Indigofera</i>	49
5. <i>Schizoglossum</i>	48
6. <i>Euphorbia</i>	41
7. <i>Aloe</i>	39
8. <i>Cyperus</i> , <i>Tephrosia</i>	37
10. <i>Lotononis</i>	33
11. <i>Eragrostis</i>	32
12. <i>Erica</i> , <i>Wahlenbergia</i> , <i>Polygala</i>	31
15. <i>Asclepias</i> , <i>Berkheya</i> , <i>Kniphofia</i> , <i>Solanum</i> ...	30
19. <i>Disa</i> , <i>Acacia</i>	29
21. <i>Eulophia</i> , <i>Rhus</i> , <i>Sutera</i>	28
24. <i>Hibiscus</i> , <i>Ipomoea</i> , <i>Rhynchosia</i>	26
27. <i>Argyrolobium</i> , <i>Delosperma</i> , <i>Pavetta</i> , <i>Plectranthus</i> , <i>Stachys</i> , <i>Vernonia</i>	25
33. <i>Scirpus</i>	24
34. <i>Digitaria</i> , <i>Habenaria</i> , <i>Selago</i> , <i>Streptocarpus</i> , <i>Thesium</i> , <i>Panicum</i>	23
40. <i>Disperis</i> , <i>Hypoxis</i>	22
42. <i>Pelargonium</i>	21
43. <i>Ceropegia</i> , <i>Hermannia</i> , <i>Lobelia</i>	20
46. <i>Gladiolus</i> , <i>Sebaea</i> , <i>Sporobolus</i>	19
49. <i>Asparagus</i> , <i>Crotalaria</i> , <i>Ficus</i> , <i>Mariscus</i>	18
53. <i>Brachystelma</i>	17
54. <i>Alepidea</i> , <i>Cyrtanthus</i>	16
56. <i>Clutia</i> , <i>Loranthus</i> , <i>Phyllanthus</i>	15

Of the 4826 species recorded in Natal, 568 species (11,77%) appear in the National Tree List (De Winter and Vahrmeijer 1972). As a number of the smaller woody shrubs are excluded from the National Tree List, the number of woody species in Natal is actually slightly higher than the 11,77% recorded and probably approaches 15% of the total number of species.

The 179 families, 1 238 genera and 4 826 species in Natal compare with the 202 families, 1 669 genera and 7 014 species (figures adjusted to exclude ferns) recorded by Hepper (Mitt. Bot. Munchen 10: 24,

1971) from the area delimited for the Flora of West Tropical Africa. Some indication of the richness of the Natal flora can be gained when it is appreciated that the area delimited for the Flora of West Tropical Africa is almost fifty times as large as Natal.

The richness of the Natal flora is due in part to the migration of subtropical elements southwards to the Tongaland plain, the area east of the Lebombo mountains. Four families (Ruppiaceae, Zannichelliaceae, Alismataceae and Vahliaceae), 77 genera (6,22%) and 278 species (5,76%) out of the total flora are restricted to this Tongaland plain. A number of the genera, for example, *Ceriops* Arn., *Inhambanella* (Engl.) Dubard, *Lumnitzera* Willd., *Newtonia* Baill., *Schlechterina* Harms and *Thalassodendron* Den Hartog are found nowhere else in the Republic. Similarly, many of the 278 species restricted to this plain are not recorded elsewhere in the Republic. This Tongaland plain is an extremely interesting area and one from which new records continue to come.

In addition to a subtropical element, the Natal flora also contains a temperate element which extends from the south-western Cape along the Drakensberg to the mountains of tropical Africa and Europe. In the Natal Drakensberg the flora becomes increasingly temperate in character with increasing altitude. This is well illustrated at high altitudes by the grasses where temperate genera such as *Danthonia* DC., *Festuca* L., and *Pentaschistis* Stapf are completely dominant. Some Cape genera, for example, *Erica* L. and *Protea* L., also enrich our flora. Other Cape elements enter southern Natal along the coast, for example, Bruniaceae, which is represented in Natal by a solitary species of *Raspalia* Brongn.

Natal is still relatively poorly collected botanically and new records and new species continue to be found. Indeed, since the Flora of Natal was completed in April 1971, five new generic records and 10 new species records (plus several undescribed species and a new generic record for South Africa) have come to light. A number of species are known only from the type collection while many other records for the province are based on a single gathering. The current conservation status of many of our species, particularly the herbaceous species, is unknown and many are probably endangered. At least one species, the orchid *Zeuxine africana* Reichb.f., known only from the Durban Bay area, is thought to be extinct. Clearly there is an urgent need for more extensive and more intensive collecting in Natal.