

Register of names and types : a comparison between Mesembryanthemaceae and Poaceae

G. E. GIBBS RUSSELL* and H. F. GLEN*

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ABSTRACT

A register of names and types for southern Africa would make possible a more rapid completion of the Flora of Southern Africa. Registers for Mesembryanthemaceae and Poaceae, families which are similar in number of species and names, but different in distribution and importance, are compared, to give guidelines for an efficient approach to extending the register to include other families.

INTRODUCTION

An essential part of the taxonomic work for the Flora of Southern Africa is indexing all names that must be evaluated, finding the original description of each name and locating the type specimens for examination (Leenhouts, 1968). This is an extremely time-consuming task and, if the traditional procedures could be streamlined, the production of the Flora would be more rapid.

Registers for two other regions have been started in the past. A register of names for North America was begun for the *Flora North America* project (Shetler & Skog, 1978). However, even though computer encoding forms for this Register made provision for a citation for each name in the checklist, and for synonyms with citations, these do not appear in the published checklist. The data-capture form published with the checklist was examined, but was felt to be too complex for the purpose at hand. In Australia a computerized register has been under development for about a decade (Burbidge, pers. comm.; Chapman, 1979). The Australian compilers have also recorded an extensive amount of data for each name, and have checked each name in its primary source.

The purpose of this paper is to compare existing registers of names in two angiosperm families of comparable size but widely different distribution, importance and history of taxonomic study in southern Africa, in order to determine guidelines for extending the register to other families in the most efficient way.

METHODS

Registers of names and types based on or applied to southern African plants have been prepared for two large families now being studied for the Flora, Mesembryanthemaceae and Poaceae. The register for Poaceae was computerized, so that listings sorted by name, reference or type could be obtained, as described by Gibbs Russell (1983).

The register for Mesembryanthemaceae was

prepared by hand. The names listed by Jacobsen (1974) as valid, together with those listed in a card index held by one of us (HFG), formed the starting point. Literature references for these were found, and the list typed when complete. Synonyms listed by Jacobsen were then noted, their sources found and the results intercalated in the appropriate parts of the typed list. The extended list was then re-typed and any further additions were made. *Index Kewensis* was the primary source of references, but each one was verified in the library at Kew. *Repertorium Plantarum Succulentarum* and the *Kew Record* were important minor sources of names and citations. In this way, a few dozen names not in *Index Kewensis* but found in Jacobsen (1974) were noted and the relevant data handed in for the next *Supplement* to the *Index*. Only names published before the end of 1974 were considered for inclusion in the Register of Names in Mesembryanthemaceae.

The numbers of names and taxa and the references for both families are compared to show differences between the two groups. These differences are related to differences in history of taxonomic study.

RESULTS

Mesembryanthemaceae and Poaceae have fairly similar numbers of taxa and names applied to these taxa, but the number of references in which names of Poaceae have been published is far greater than the number of references in which names for Mesembryanthemaceae have been published (Table 1). On average, more than three times as many names occur per reference in Mesembryanthemaceae than in Poaceae. Figures 1 and 2 show the numbers and percentages of names found in each of the references contributing 1% or more of the total. In Mesembryanthemaceae, over a third of the names are derived from a single reference, and over half the names are found in the three most important references. Furthermore, the minor references, with fewer than 1% of the total, account for only 16% of the names. In Poaceae, fewer than one eighth of the names are derived from a single reference, whereas the minor references contain more than 40% of the names. The generalization can be made that the names for Poaceae are more scattered in the literature than for Mesembryanthemaceae.

* Botanical Research Institute, Department of Agriculture, Private Bag X101, Pretoria 0001.

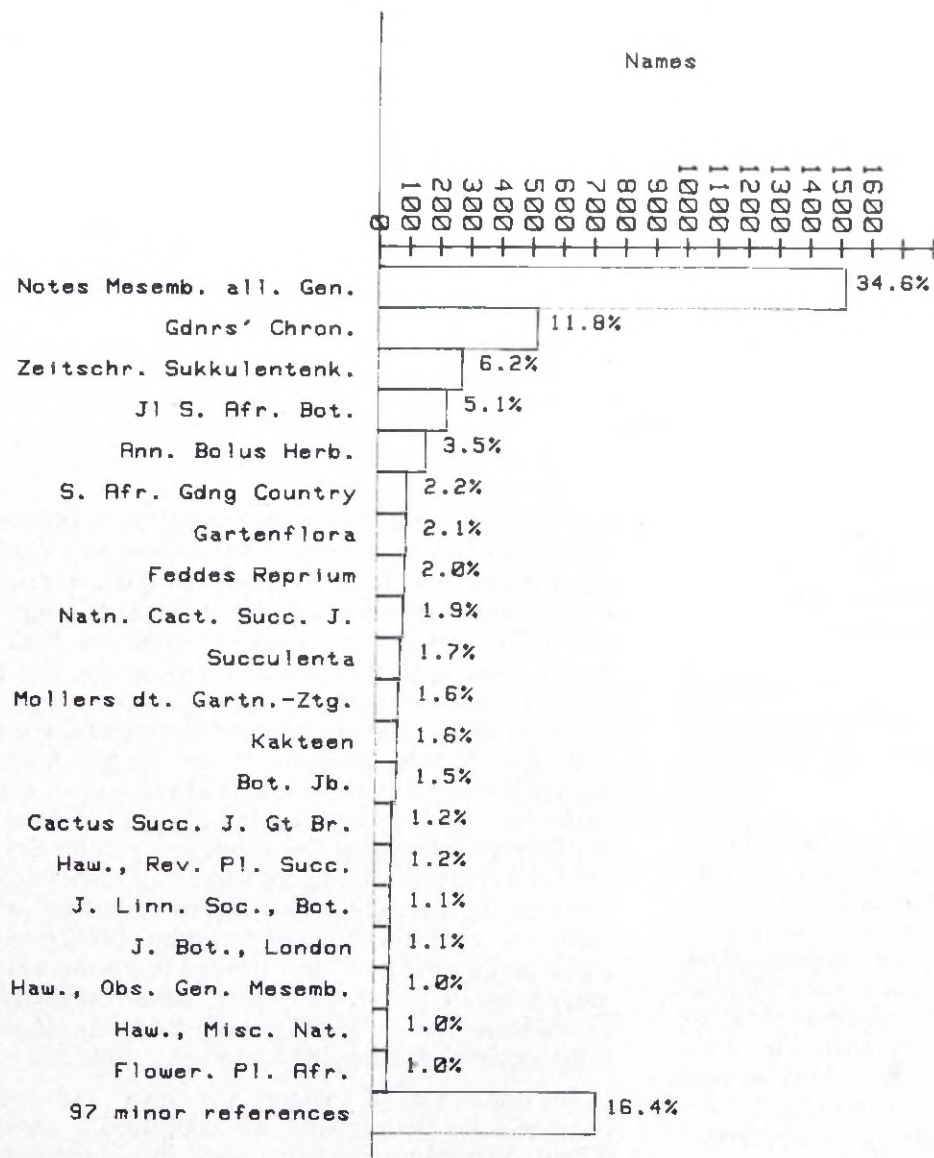


FIG. 1.—Mesembryanthemaceae major references, which each contribute 1% or more of the total references. The number of names is indicated across the top, and the percentage contribution of each reference is given at the end of its bar.

TABLE 1.—Comparison between Mesembryanthemaceae and Poaceae for numbers of taxa, names and references

	Mesembryanthemaceae	Poaceae
No. of taxa	ca. 1 200	ca. 1 050
No. of names	4 382	4 239
No. of references	117	412
Average names per taxon	3.7	4.2
Average names per reference	37.4	10.2

Table 2 shows the 31 references common to both families. Only one reference listed occurs among the major references for both families. Five of the major references for Mesembryanthemaceae and eight of the major references for Poaceae occur on the joint list. However, the other 17 references common to the two families are minor references in both. The low value (11.7%) for the Sorenson (1948) coefficient of similarity comparing the occurrence of references common to the two families emphasizes the differing sources of names in each. Only one

sixth of the names in Mesembryanthemaceae are derived from common references, but over a third of the names for Poaceae are found in these sources. The generalization can be made that there are few common references of importance for both families, but that the common references are more important as sources of names in Poaceae than in Mesembryanthemaceae.

DISCUSSION

The differences in occurrence of names in the literature between the two families is the result of their differing history of taxonomic treatment, which has occurred because of differences in their distribution and economic and ecological importance. Although the two families have similar numbers of taxa, they differ in their distribution and importance.

Worldwide, Mesembryanthemaceae is centred on southern Africa, with a few weedy species occurring

in the Mediterranean area, Australia and the warm parts of America, whereas Poaceae occurs on all the continents and forms about 20% of the world's vegetation (Heywood, 1978). In Africa, Mesembryanthemaceae ranks as fourth largest family in South West Africa/Namibia and as ninth largest family in the Cape Peninsula. It is not among the largest families in any other region. Poaceae is one of the three largest families (with Asteraceae and Fabaceae) in all completed African Floras (Gibbs Russell, 1975). In Mesembryanthemaceae, 115 of the 120 genera are endemic in the Flora of Southern Africa area, whereas in Poaceae only 12 of the 204 genera are endemic.

Mesembryanthemaceae is economically important for species cultivated as garden ornamentals, and one species grown as a roadside sand binder, whereas Poaceae comprises the world's major grain and fodder crops, as well as the most important pasture plants (Lawrence, 1951). A measure of the comparative ecological importance of these two families is indicated by Acocks (1975), as shown in Table 3. In his study, Poaceae has more taxa, which

are listed more frequently, and occur in more veld types than Mesembryanthemaceae.

This difference in distribution and importance explains the difference in history of taxonomic treatment. Poaceae has wide-spread distribution and high economic and ecological importance, so the family has been studied by many botanists over the years. Also, work done elsewhere on widespread taxa is essential for studies in southern Africa. Therefore Poaceae has an extensive literature, and many of the references are general accounts of the flora, or are treatments from distant places. Mesembryanthemaceae has a restricted distribution, and is of lower economic and ecological importance. The family therefore has not been studied as extensively as Poaceae and, because so few taxa are widespread, not as much work has been done elsewhere. Therefore, Mesembryanthemaceae has fewer references in the literature, most of which are of a specialist nature. These differences explain the small number of references important for both families.

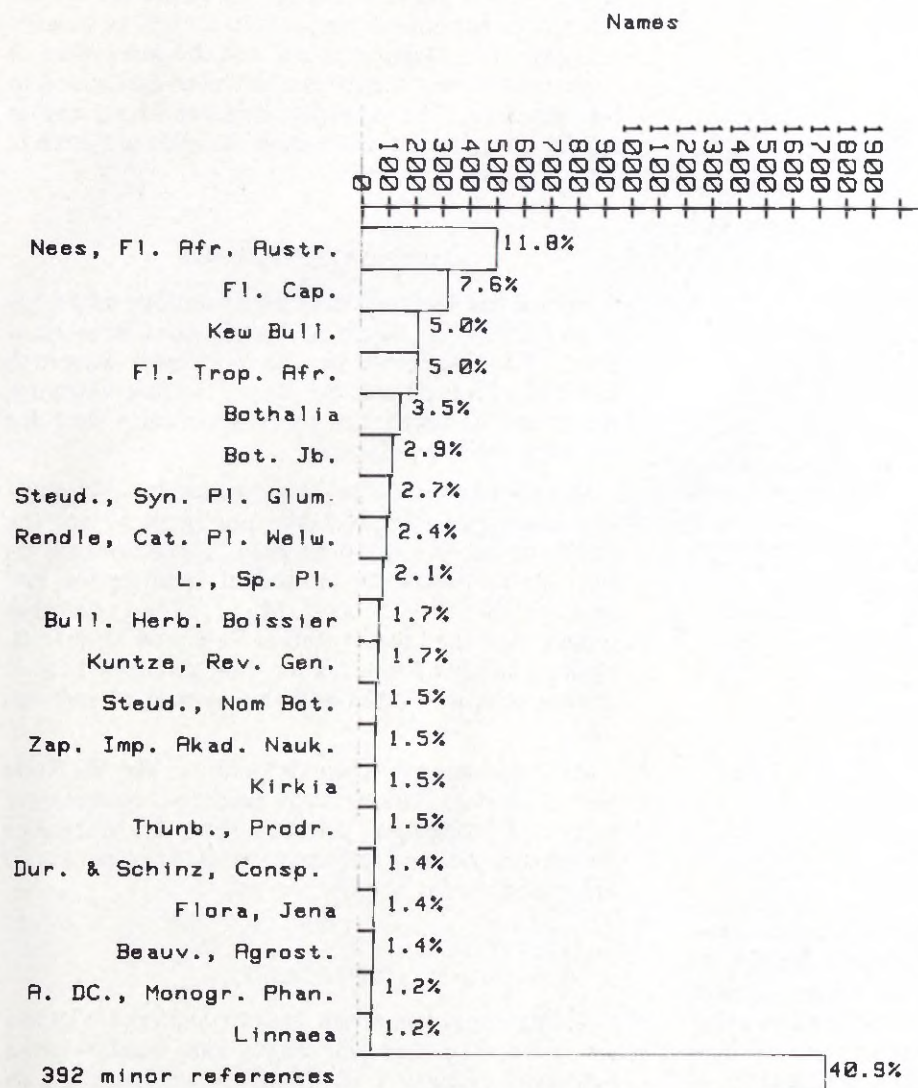


FIG. 2.—Poaceae major references, which each contribute 1% or more of the total references. The number of names is indicated across the top, and the percentage contribution of each reference is given at the end of its bar.

TABLE 2. References common to both Mesembryanthemaceae and Poaceae

Reference	No. names in Mesembryanthemaceae	No. names in Poaceae
Ait., Hort. Kew	18	2
Ann. Bolus Herb.	155*	2
Ann. S. Afr. Mus.	3	4
Boiss., Fl. Or.	1	4
Bot. Arch.	1	4
Bot. Jb.	67*	102*
Bothalia	10	150*
Bull. Herb. Boissier	3	74*
Bull. Soc. Hist. nat. Afr. N.	2	5
Burch., Trav.	3	5
Engl., Pflanzenw. Afr.	1	2
Feddes Réprium	88*	32
Fl. Afr. Nord	1	2
Fl. Cap.	18	324*
Fl. Trop. Afr.	2	213*
Hooker's Icon. Pl.	2	24
J. Linn. Soc., Bot.	50*	19
Jl S. Afr. Bot.	170*	19
Kew Bull.	31	214*
Kuntze, Rev. Gen.	2	72*
L., Sp. Pl.	39	88*
L., Syst. Nat. Ed. 10	4	12
L.f., Suppl.	1	14
Lam., Encycl.	3	24
Mitt. bot. StSamml., Munch.	20	14
Notizbl. bot. Gart. Mus. Berl.	7	20
Oest. Bot. Z.	1	13
Thunb., Fl. Cap.	2	2
Thunb., Prodr.	3	6
Trans. R. Soc. S. Afr.	13	15
Willd., Enum.	1	14
Total no. of names in common references	722	1 552
Percentage of names in common references	16,5%	36,6%
Sorenson (1948) coefficient of similarity between reference lists for the two families		11,7

* Major reference, contributing 1% or more of the total names for the family.

TABLE 3.—Ecological importance of the two families indicated by their occurrence in the lists of Acocks (1975), for his seventy veld types

	Mesembryanthemaceae	Poaceae
No. of taxa	143	283
No. of times taxa appear in lists	255	1 620
No. of veld types	16	69

CONCLUSION

If Poaceae, a widespread important family, and Mesembryanthemaceae, a restricted family of relatively lower economic and ecological importance, are regarded as ends of a continuum, other families can be compared to them to determine how much they would benefit from a complete register of names. The more widespread and important a family

is, the greater the number of references it may be expected to have, but a substantial proportion of these may be found in sources it shares with other families. The less widespread and important a family is, the fewer references it may be expected to have, but a smaller proportion of its names may be found in common sources.

Because the majority of references in Poaceae and Mesembryanthemaceae are not drawn from common sources, a complete register for all families may be expected to have a high proportion of references useful for only a single family. If computerized, such a register would be difficult to manage because of its large size, even though most of the references would not be of use in more than one family.

Therefore, it is suggested that a complete register of all names and types should be compiled in two steps. In the first step, a preliminary register should be drawn from sources which are of widespread coverage or historical importance, such as *Flora Capensis*, *Flora of Tropical Africa*, Thunberg's *Prodromus*, etc., as well as from journals known to be of importance for southern African plants, such as *Kew Bulletin*, *Botanische Jahrbucher* and *Bothalia*. This work would be performed once, and would apply to a number of families, being most useful in widespread and important groups. In the second step, when a particular family is under study, the references from these major sources will be readily available as a starting point, and the references of value only to that family can be traced and added to the Register. The complete register of all names would therefore grow as more families are studied for the Flora.

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At the Botanical Research Institute, Mrs W. Roux and Mrs C. Fourie have encoded names and corrected computer printout. Mr S. Makgakga counted names and references, and the comparisons are based on his counts.

UITTREKSEL

'n Register van name en tipes vir Suider-Afrika sou die voltooiing van die Flora van Suider-Afrika bespoedig. Registers vir Mesembryanthemaceae en Poaceae, families wat soortgelyk in getal spesies en

name is, maar wat verskil in verspreiding en belangrikheid, word vergelyk om riglyne vir 'n doelgerigte benadering aan die uitbreiding van die register te gee, om ander families in te sluit.

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