



The demise of *Monechma*: new combinations and a new classification in the resurrected genera *Meiosperma* and *Pogonospermum* (Acanthaceae)

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Summary. Recent molecular phylogenetic results have demonstrated that *Monechma* s.l., a group of plants with ecological importance in the savanna and succulent biomes of sub-Saharan Africa, is polyphyletic with two discrete lineages recognisable. In the present work, we recognise *Monechma* Groups I and II at the generic rank, which can be distinguished by differences in inflorescence characteristics and seed morphology. The nomenclatural implications of these findings are investigated. The lectotype of *Monechma*, *M. bracteatum* Hochst., is a part of a small lineage of plants closely allied to *Justicia* L. sect. *Harnieria* (Solms) Benth. for which the earliest valid name is found to be *Meiosperma* Raf. Hence, *Monechma* is synonymised within *Meiosperma*, which comprises six accepted species and two undescribed taxa. The majority of species of former *Monechma* s.l. are resolved within the second lineage for which the only validly published generic name is *Pogonospermum* Hochst. This resurrected genus comprises 34 accepted species plus two undescribed taxa. *Pogonospermum* displays considerable morphological variation and is here subdivided into six sections based primarily on differences in plant habit, inflorescence form, calyx, bract and bracteole venation, and seed indumentum. The new combinations and new sections are validated, and seven accepted species names are lectotypified.

Key Words. Africa, Justiciaeae, Justicioid, nomenclature, savanna biome, succulent biome, taxonomy.

Introduction

With at least 2000 species, the Justiciaeae (Acanthaceae: Acanthoideae) are the largest tribe of Acanthaceae, and are the source of numerous taxonomic challenges due to complex morphological variation including frequent homoplasy (Daniel *et al.* 2008; Kiel *et al.* 2017, 2018; McDade *et al.* 2018, 2021; Darbyshire *et al.* 2019a; Manzitto-Tripp *et al.* 2021). Particularly problematic is generic delimitation of *Justicia* L. and allies in the subtribe Justiciinae (sensu Manzitto-Tripp *et al.* 2021), where molecular phylogenetic data demonstrate that several morphologically discrete genera are nested within *Justicia* s.l. (Kiel *et al.* 2017, 2018). To maintain a broadly circumscribed *Justicia* as defined in most modern taxonomic treatments, the entire Justiciinae would have to be treated under *Justicia* s.l., but this is highly undesirable as it would result in the loss of much valuable taxonomic information. The most favourable alternative option is to disaggregate *Justicia* and to recognise discrete, well-supported and well-sampled clades as separate genera, backed by knowledge of taxonomically informative morphological traits (Darbyshire *et al.* 2019a, 2020).

One such genus nested within the Justiciinae is *Monechma* Hochst. (or *Justicia* sect. *Monechma* (Hochst.) T. Anderson), a striking radiation of African plants. Species of *Monechma* range throughout sub-Saharan Africa, but are most diverse and abundant in the savannas, deserts, and shrublands of southwestern Africa, especially portions of Namibia and southern Angola (Munday 1983; Darbyshire *et al.* 2020). In this region, plants of *Monechma* comprise some of the most dominant elements of landscapes, together with species in three other parallel radiations of Acanthaceae, *Petalidium* Nees, *Barleria* L., and *Blepharis* Juss. (Vollesen 2000; Tripp *et al.* 2017; Darbyshire *et al.* 2019b, 2020, 2021). This ecological significance has motivated recent interest in *Monechma*, where a RADseq phylogenetic analysis which included over 75% of the currently accepted species, resolved relationships amongst this important group (Darbyshire *et al.* 2020).

Phylogenetic results presented in Darbyshire *et al.* (2020) confirmed earlier results based on evidence from six molecular markers (Kiel *et al.* 2017) that *Monechma* s.l. in fact comprises two widely separated

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lineages, named *Monechma* Groups I and II. The RADseq study, however, refined delimitation of these two clades from the earlier study by Kiel *et al.* (2017). Specifically, it revealed that the group of perennial (rarely annual) herbaceous taxa from the savanna biome of tropical Africa, with usually terminal spiciform inflorescences and bracts \pm highly modified from the leaves (*M. ciliatum* (Jacq.) Milne-Redh., *M. scabridum* S.Moore and allies) is allied to the group of mainly perennial shrublets with \pm undifferentiated bracts (*M. cleomoides* (S.Moore) C.B.Clarke and relatives) primarily from the succulent biome of southern Africa (Darbyshire *et al.* 2020). This tropical savanna group was not sampled in the earlier study of Kiel *et al.* (2017) but based on morphological extrapolation, both that study and Darbyshire & Goyder (2019) later surmised that the tropical savanna group was allied to species of the *M. debile* (Forssk.) Nees complex, which are mostly annual, ruderal species with spiciform inflorescences and highly modified bracts. However, the RADseq analysis demonstrated that *M. debile* and allies form their own discrete clade, closely allied to *Justicia* sect. *Harnieria* (Solms) Benth. Study of a range of morphological traits revealed that the two clades of *Monechma* under their revised circumscriptions could be separated by differences in inflorescence and seed characters (Darbyshire *et al.* 2020). It was therefore concluded that these two clades should be elevated to distinct genera, but Darbyshire *et al.* (2020) refrained from nomenclatural changes.

In the present work, we recognise *Monechma* Groups I and II at the generic rank as *Meiosperma* and *Pogonospermum* respectively, and provide the appropriate new combinations following a nomenclatural review. We also build on the morphological studies of Darbyshire *et al.* (2020) to propose a formal sectional classification for *Monechma* Group II (*Pogonospermum*).

This is an early step in the process of redefining the genera within Justiciinae. Moving forward, further detailed studies employing NGS techniques comparable to that presented in Darbyshire *et al.* (2020), are required across Justiciinae in order to provide a revised classification. To this end, a RADseq analysis of the New World Justiciinae is currently in progress (C. A. Kiel *et al.* in prep.).

Materials and Methods

The present contribution consists of two parts. The nomenclatural study is based on a review of relevant literature on *Monechma* and allied genera, including protologues and relevant Flora accounts. The taxonomic study is based on examination of herbarium collections and images of species in situ, in combination with the phylogenetic results of the RADseq dataset of Darbyshire *et al.* (2020). Most observations were made on herbarium specimens held at COLO, K, RSA and WIND (herbarium abbreviations follow

Thiers, [continuously updated](#)), with additional observations made via access to digital images of type specimens on JSTOR Global Plants (<https://plants.jstor.org/>) and other online repositories of herbarium specimen images.

For species not sampled in Darbyshire *et al.* (2020), best estimations for taxonomic placement were made based on morphological traits. Type specimens are cited for the accepted names; those seen by one or more of the authors are marked with an “!”; those seen as digital images are marked with an “*”.

Species delimitation follows a combination of Hedrén (2006a, 2006b), Munday (1995), Vollesen (2010, 2015) and Darbyshire & Goyder (2019), with some modifications based on the current study. For each accepted species, the geographic range is derived from herbarium collections, online databases (notably Plants of the World Online, POWO 2020) and relevant taxonomic literature, principally those cited above.

In the section on nomenclatural renovations, a “^” denotes that the species was sampled in the RADseq study (Darbyshire *et al.* 2020).

Results and Discussion

Applying the correct generic names to *Monechma* Group I and *Monechma* Group II

Monechma was first described by Hochstetter (1841: 374) who included two species, both based on collections from the expedition to Nubia by Theodor Kotschy: *M. bracteatum* Hochst. (*Kotschy it. nubico* 261) and *M. hispidum* Hochst. (*Kotschy it. nubico* 239). Later, having seen further cultivated material of *Monechma* from seeds grown on from Kotschy’s collections, Hochstetter (1844: 5) chose to separate *Monechma* into two genera and described *Pogonospermum* Hochst. based on his *M. hispidum* (= *P. hispidum* (Hochst.) Hochst.) plus a second species, *P. ciliare* that was based on *Justicia ciliaris*, which Hochstetter wrongly attributed to Vahl, having overlooked Linnaeus’ (1781) earlier application of this name. Hochstetter also erred in using the epithet “ciliare” given that he also included the earlier name *J. ciliata* Jacq. in synonymy. Hochstetter cited differences in seed characteristics as justifying the recognition of two genera, i.e., *Monechma* sensu stricto has glabrous seeds, whilst the seeds of *Pogonospermum* have tufts of trichomes at the base and apex. By splitting *Pogonospermum* from *Monechma*, Hochstetter indicated that *Monechma* was now to be based on *M. bracteatum* and, indeed, *Monechma* was subsequently lectotypified with *M. bracteatum* by Phillips (1951).

In describing *Monechma* and *Pogonospermum*, however, Hochstetter had overlooked two earlier generic names of relevance to this group that require consideration here. Firstly, Rafinesque (1838: 64) described *Meiosperma* based on *Dianthera debilis* Forssk.

Rafinesque noted that his new genus differed from *Dianthera* L. (= *Justicia* in current classifications; with *Justicia* sect. *Dianthera* (L.) V.A.W.Graham being exclusively New World as currently circumscribed; Graham 1988) in having single-seeded capsules, which was clearly a mistake as *D. debilis* is 2-seeded. He went on to note “...thus not even of this family, are the cells monosperm? The cor[olla] is bilabiate but undescribed. Type *D. debilis* Forsk. Vitm.” (p. 64). This suggests that Rafinesque did not see the material in the Forsskal herbarium on which *D. debilis* was based, rather he was reliant on Vitman’s (“Vitm.”) description of this species in his *Summa Plantarum* (Vitman 1789: 46), who recorded this species as being monospermous. Vitman’s record was, in turn, based upon Forsskål’s (1775) description of *D. debilis* in which he stated in error “capsula bilocularis, monosperma” (p. 9). It is perhaps on the basis of this perpetuated error in recording the number of seeds per capsule that Hochstetter overlooked *Meiosperma* when describing *Monechma*. However, an alternative explanation may relate to Rafinesque’s work being widely rejected in the biological community at that time (Boewe 2005) and so it may have been dismissed by Hochstetter. Wood *et al.* (1983) note that there are two specimens in the Forsskal herbarium with the name *Dianthera debilis*: microfiche 38: II. 3–4 and 38.II.5–6, and that they represent different species. Forsskal 38: II.3–4 is an informative specimen, with an open corolla and mature fruits and seed. This is clearly the specimen from which the name *D. debilis* has been applied in subsequent works (e.g. Nees 1847; Clarke 1900) and was selected as lectotype by Wood *et al.* (1983). Forsskal 38.II.5–6, although superficially similar in inflorescence form, is actually referable to *Ecbolium violaceum* (Vahl) Hillcoat & J.R.I.Wood. Irrespective of these complications, *Meiosperma* was validly published with *D. debilis* as the type species. Rafinesque (1838) did not make the new combination for this species in *Meiosperma*, but this is acceptable under the Botanical Code (Turland *et al.* 2018).

As first noted by Hochstetter (1843), *Dianthera debilis* and *Monechma bracteatum* are closely allied species and have often been united in past taxonomic treatments, under *M. debile* (Forssk.) Nees s.l. (e.g. Munday 1995; Welman 2003; Ensermu 2006; Klaassen & Kwembeya 2013). Both our RADseq dataset (Darbyshire *et al.* 2020) and earlier phylogenetic studies (Kiel *et al.* 2017) confirm a close relationship between these two species within *Monechma* Group I. Therefore, *Meiosperma* Raf. is the oldest valid name for *Monechma* Group I sensu Darbyshire *et al.* (2020) and has priority over *Monechma* Hochst.

Secondly, Endlicher (in Endlicher & Fenzl 1839: 81) described *Schwabea*, with a single species, *S. modesta* Endl., based on a Kotschy collection from tropical East Africa (probably Sudan) that was grown in cultivation

in Charles von Hügel’s botanic garden in Hietzing, Vienna. Unfortunately, the Kotschy specimen in question was not numbered, nor was the precise collecting locality cited in the protologue, hence a corresponding herbarium collection is difficult to trace with certainty. Endlicher described this plant as having four didynamous stamens, which would not fit the genera allied to *Justicia*. However, in de Candolle’s *Prodromus*, Nees (1847) stated that he considered Endlicher to have been mistaken in his recording of the number of stamens and he equated *Schwabea* with Hochstetter’s *Pogonospermum*, reducing the latter to synonymy. Nees proposed the new combination *Schwabea ciliaris* (Vahl) Nees, with *S. modesta*, *P. ciliare* and *P. hispidum* all listed in synonymy. He also described a second species, *S. spicigera* Nees, with two varieties, both based on *Heudelot* specimens from “Senegambia”. In *Flora of Tropical Africa*, Clarke (1900) disagreed with Nees’ interpretation of *Schwabea* and excluded it from his “Eu-Justicieae” based on it having four stamens. Clarke reverted to Hochstetter’s original (1841) circumscription of *Monechma*, reuniting it with *Pogonospermum* and with *Schwabea sensu* Nees (which, confusingly, he used as the name for a proposed section of *Monechma*). Clarke’s view has since prevailed for over a century, except that some authors (e.g. Hedrén 1990, 2006b; Vollesen 2010, 2015; Manning & Goldblatt 2014; Darbyshire & Goyder 2019) have treated *Monechma* as a section of *Justicia*. Hence *Pogonospermum ciliare* and *P. hispidum* are currently treated as synonyms of either *Monechma ciliatum* (Jacq.) Milne-Redh. or *Justicia ciliata* Jacq.

Endlicher’s (in Endlicher & Fenzl 1839) Latin description of *Schwabea modesta* is thorough and, although some details of the plant do seem to align with *Monechma ciliatum*, there are some anomalies, not least of which is the recording of four didynamous stamens. Whilst some species of Acanthaceae that usually have two fertile stamens can occasionally have aberrant flowers with four stamens perfected (McDade *et al.* 2021), particularly when in cultivation, this is rare in taxa that lack staminodes, as is the case in the Justicioid Lineage. Further, Endlicher recorded the seeds of *S. modesta* as having hygroscopic trichomes, which would not fit with *M. ciliatum*, unless he misinterpreted the bristly trichomes of that species. Endlicher (in Endlicher & Fenzl 1839) suggested a possible affinity with his own genus *Russegggera* Endl. (= *Lepidagathis* Willd.) and this could potentially fit with the description, although no known species of *Lepidagathis* from East Africa fit with the description of *S. modesta*. Meisner (1840) subsequently reaffirmed this close relationship by placing *Russegggera* and *Schwabea* in a separate tribe of Acanthaceae, *Russegggerae*. The available evidence therefore suggests that Clarke (1900) was correct in his assertion that Nees (1847) erroneously equated *Schwabea* with

Pogonospermum, and we consider *Schwabea* to be an unplaced name. Indeed, it was treated as such in the recent reclassification of Acanthaceae (Manzitto-Tripp *et al.* 2021).

Monechma ciliatum is somewhat unusual in its seed indumentum in comparison to other known species of *Monechma* Group II, but it is nevertheless confirmed as a member of that clade in the study of Darbyshire *et al.* (2020), which rejected the exclusion of *M. ciliatum* from *Monechma* Group II ($P < 0.001$; see Table 2 of Darbyshire *et al.* 2020). In following Clarke (1900) and rejecting *Schwabea* s.s., *Pogonospermum* is therefore the earliest name for *Monechma* Group II sensu Darbyshire *et al.* (2020). The word root of the name *Pogonospermum* (“bearded seeds”) is not ideal in view of the fact that, although several species in this clade have pubescent seeds, only those of *M. ciliatum* could be described as “bearded”. We are nevertheless obliged to adopt this generic name for this clade if it is to be recognised as a discrete genus, as proposed below.

Should the generic name *Monechma* be conserved?

An alternative to resurrecting both *Meiosperma* and *Pogonospermum* for *Monechma* Groups I and II would be to propose to conserve *Monechma* over one or other of these names. The obvious choice here would be to propose to conserve *Monechma* over *Meiosperma* given that the types of these two names are congeneric. As *Meiosperma* has not been used since Rafinesque’s (1838) original publication of the name, it is plausible that a proposal to conserve *Monechma* over *Meiosperma* might be successful. However, there are problems with this choice. Firstly, as the large majority of diversity within *Monechma* s.l. falls within Group II (*Pogonospermum*), this would not result in much greater nomenclatural stability, as the names for only three currently accepted species (*Monechma bracteatum*, *M. debile* and *M. monechmoides* (S.Moore) Hutch., representing only half of the currently accepted species in Group I and only 7.5% of the species diversity across *Monechma* s.l.) would be retained. Secondly, the name *Monechma debile* is problematic as the circumscription of this species has varied widely in the past and, in its broadest sense, has been applied to most members of *Monechma* Group I, including to the more widespread and abundant taxon and type of *Monechma*, *M. bracteatum* (e.g. see Munday 1995;

Ensermu 2006). Given this confusion, it is not greatly desirable to maintain the name *Monechma debile*.

The second alternative would be to propose to conserve *Monechma* over *Pogonospermum*. This would have the advantage of maximising nomenclatural stability given that 26 of the 34 currently accepted species in Group II have a name available in *Monechma*. However, this would require a proposal to change the lectotype of *Monechma*, from *M. bracteatum* to *M. hispidum*. The resultant significant change in circumscription of *Monechma* — including the preclusion of the most widespread, common and familiar taxa, i.e., *M. debile* and its allies — would likely create significant confusion for non-specialists over application of the name *Monechma*. Given that many species in Group II are highly range-restricted and little-known species and only rarely cited in the literature (e.g., a search in May 2021 for *Monechma* in Google Scholar returns only 1,160 results), it would seem inappropriate in this case to propose the rather drastic change in the lectotype, given the controversy over such a proposal. Furthermore, such a change would run contrary to the valid decision made by Hochstetter (1844) in terms of the segregation of *Pogonospermum* from his *Monechma* as discussed above.

In conclusion, it is our opinion that neither option for conserving *Monechma* is desirable and thus we propose to accept *Meiosperma* and *Pogonospermum*, and adopt the necessary nomenclatural changes.

Generic delimitation and infrageneric classification in *Meiosperma* and *Pogonospermum*

A summary phylogeny placing the newly resurrected genera *Meiosperma* (*Monechma* Group I sensu Darbyshire *et al.* 2020) and *Pogonospermum* (*Monechma* Group II sensu Darbyshire *et al.* 2020) in the context of related clades in Justiciaceae is presented in Fig. 1, based on the results of the RADseq phylogeny in Darbyshire *et al.* (2020). In the Nomenclatural Renovations section below, we provide the new combinations in *Meiosperma* and *Pogonospermum* for all currently recognised members of *Monechma* or *Justicia* section *Monechma*. Table 1 provides a summary of these two genera and how they relate to the nomenclature in Darbyshire *et al.* (2020). The two genera can be separated by application of the key below.

Key to distinguish the reinstated genera *Meiosperma* and *Pogonospermum*

- Inflorescences of axillary or both axillary and terminal spikes; bracts elliptic, ovate or obovate, often imbricate, inflorescence units at each axil often > 1-flowered; seeds 2 – 3 mm diam., lenticular with a sharp rim, \pm symmetrical in cross section and lacking a prominent ridge on one side, glabrous* ***Meiosperma***
- Inflorescences either axillary and single-flowered (bracts undifferentiated from the leaves) or in well-defined, mostly terminal spikes (bracts highly modified), rarely in axillary pedunculate fascicles; bracts in species with

well-defined spikes usually narrow, linear to lanceolate, or rarely (in one species) broadly elliptic to obovate; seeds variable, often larger than 3 mm in diam. with a rounded rim (including in the single species with broad bracts) and/or variously pubescent, or if small and with sharp rim then asymmetric in cross section and with a prominent ridge on one side*.....**Pogonospermum**

*for illustration of the differing seed morphology, see Fig. 8 in Darbyshire *et al.* (2020).

Meiosperma

Meiosperma, as currently defined, comprises six accepted species and two undescribed taxa (Fig. 2, Table 1). These species are closely allied morphologically (although *M. tetrasperma* is notable for having 4-seeded capsules, the other species having only 2-seeded capsules), and no infrageneric taxa are proposed. Species delimitation in this group is challenging, with significant infraspecific variation noted in several of the widespread species as currently delimited. A full revision of *Meiosperma* is desirable, ideally supported by an expanded phylogenetic study.

Both Kiel *et al.* (2017) and Darbyshire *et al.* (2020) noted a close relationship between *Meiosperma* (*Monechma* Group I) and a paraphyletic *Justicia* sect. *Harnieria* (Fig. 1). However, Darbyshire *et al.* (2020) noted that monophyly of sect. *Harnieria* cannot be rejected by the results from the RADseq analysis. *Meiosperma* and species in sect. *Harnieria* are easily separated by differences in seed sculpturing: seeds of the former are smooth whilst those of the latter are variously tuberculate (see Fig. 14 in Hedrén 1989 but note that 14H with smooth seeds is mislabelled as *Justicia mollugo* C.B. Clarke in sect. *Harnieria* when it actually represents South American *J. peruviana* Cav.; see also Fig. 12G–H in Kiel *et al.* 2017). It is also worth noting that some species of sect. *Harnieria*, such as *J. diclipteroides* Lindau and *J. heterocarpa* T. Anderson, are heterocarpic, and have winged indehiscent 1-seeded fruits in addition to the typical explosively dehiscent 4-seeded capsules (Hedrén 1989). In such cases the seeds in the indehiscent fruits are smoother than in the dehiscent fruits but still have some tubercles (see Hedrén 1989, Fig. 14D). This phenomenon of heterocarpy is not observed in *Meiosperma*.

In addition to the difference in seed sculpturing, the axillary inflorescences of *Meiosperma* are often more developed, forming spikes with broad imbricate bracts whilst those of sect. *Harnieria* are usually fasciculate. However, there is some overlap in inflorescence form, and Hedrén (1990) noted similarities in the structure of

the cymose units within the inflorescences of members of these two groups. Darbyshire *et al.* (2020) provide further discussion on morphological similarities and differences between the two. Additional RADseq sampling in sect. *Harnieria* would elucidate the relationship between these taxa. Depending on the outcome of further studies, either sect. *Harnieria* will need to be elevated to generic status (*Harnieria* Solms) or *Meiosperma* will need to be expanded to include sect. *Harnieria* and so include taxa with both smooth and sculptured seeds. This would increase the size of *Meiosperma* significantly, as sect. *Harnieria* has c. 50 recognised species in Africa alone (Hedrén 1989, and with subsequent additions and modifications in e.g. Vollesen 2010, 2015; Champluvier 2013).

Pogonospermum

Pogonospermum is a larger and morphologically more diverse genus than *Meiosperma* (as currently delimited — see above), with 34 species currently recognised and with at least two undescribed taxa. Darbyshire *et al.* (2020) discussed the infrageneric variation in this group and noted two major clades, the first (the “*ciliatum/scabridum*” clade) with pubescent seeds and the second with glabrous seeds. This second clade was further subdivided into four clades that can be separated based on variation in inflorescence form, venation of the calyx lobes and bracteoles, and seed shape. In the Taxonomic Renovations section, we formally recognise these clades as sections of *Pogonospermum* (Table 1), which can be separated using the key below. The “*ciliatum/scabridum*” clade of Darbyshire *et al.* (2020) is subdivided here, with *Pogonospermum ciliatum* (the type species of the genus) treated in its own section, separate from sect. *Savannicola* which contains the other species with pubescent seeds; these two sections are easily separated by differences in plant life form and seed indumentum. Therefore, six sections are recognised in *Pogonospermum* (Figs 1 & 3, Table 1).

Key to the six sections of *Pogonospermum*

1. Annual herbs; seeds with tufts of bristly trichomes at apex and base.....sect. **Pogonospermum**

- Usually perennial herbs or shrublets; if annual herbs then seeds glabrous.....2
- 2. Bracts largely undifferentiated from leaves or only gradually and slightly modified towards apex of fertile branches; flowers therefore appearing axillary or at most forming a weakly-defined and leafy spike.....sect. **Aridicola**
 Bracts clearly modified from leaves; inflorescences of well-defined terminal or terminal and axillary spikes, or rarely of axillary pedunculate fascicles.....3
- 3. Seeds white-puberulous at least when young.....sect. **Savannicola**
 Seeds glabrous.....4
- 4. Calyx lobes and bracteoles each with 3 prominent veins externally, these often darker in colour than the intercostal areassect. **Tricostatum**
 Calyx lobes and bracteoles with veins either all inconspicuous or with only the midvein prominent and not darker than the intercostal areas.....5
- 5. Plants of fire-prone habitats; marked by herbaceous growth from a woody base and rootstock.....sect. **Virgultorum**
 Plants not of fire-prone habitats; subshrubs with woody mature stems.....sect. **Serotinum**

The largest section in *Pogonospermum* is sect. *Aridicola* that comprises 17 species, many of which are confined to the deserts and xeric bushlands of the

succulent biome in southwest Africa (Munday 1983; Darbyshire *et al.* 2020). In Darbyshire *et al.* (2020), *P. incanum* (Nees) I.Darbysh. & Kiel was resolved as

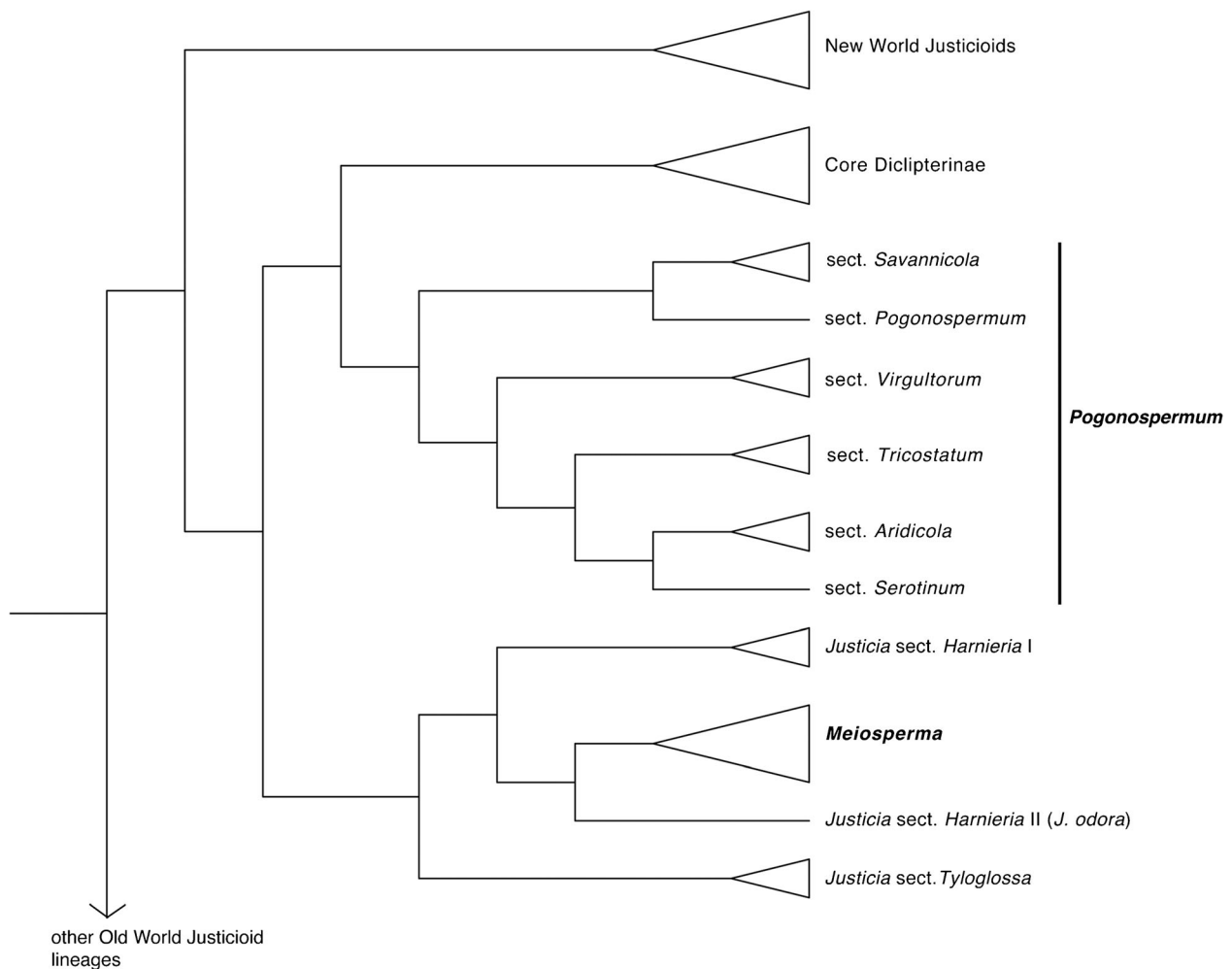


Fig. 1. Summary RADseq phylogeny of former members of *Monechma* s.l. and allied clades in Justiciaceae; data summarised from Darbyshire *et al.* (2020).

Table 1. Summary of taxonomy of former members of *Monechma* (or *Justicia* sect. *Monechma*) and relationship to clades recognised in Darbyshire *et al.* (2020).

Name of clade in Darbyshire <i>et al.</i> (2020)	Accepted name in the current work	Number of species	Type species	Distribution
<i>Monechma</i> Group I	<i>Meiosperma</i> Raf.	6 (plus two undescribed)	<i>Meiosperma debile</i> (Forssk.) I.Darbysh. & E. Tripp	Tropical and southern Africa, southern Arabia, India
<i>Monechma</i> Group II	<i>Pogonospermum</i> Hochst.	34 (plus two undescribed taxa)	<i>Pogonospermum ciliare</i> (L.f.) Hochst. = <i>P. ciliatum</i> (Jacq.) I.Darbysh. & Kiel see above	Tropical and southern Africa
<i>ciliatum/scabridum</i> clade pro parte	<i>Pogonospermum</i> sect. <i>Pogonospermum</i>	1		Senegal to Ethiopia, south to Zambia and Tanzania
<i>ciliatum/scabridum</i> clade pro parte	<i>Pogonospermum</i> sect. <i>Savannicola</i> I.Darbysh. & Kiel	5	<i>Pogonospermum scabridum</i> (S.Moore) I.Darbysh. & Kiel	Senegal to Sudan, south to Angola, Zimbabwe and Mozambique
<i>virgultorum</i> clade	<i>Pogonospermum</i> sect. <i>Virgultorum</i> I.Darbysh. & Kiel	2	<i>Pogonospermum virgultorum</i> (S.Moore) I.Darbysh. & Kiel	Angola, Zambia
<i>tricoctatum</i> clade	<i>Pogonospermum</i> sect. <i>Tricoctatum</i> I.Darbysh. & Kiel	7	<i>Pogonospermum tricoctatum</i> (Vollesen) I.Darbysh. & Kiel	Angola, Tanzania, Zambia (most species in Angola)
<i>serotinum</i> clade	<i>Pogonospermum</i> sect. <i>Serotinum</i> I.Darbysh. & Kiel	1	<i>Pogonospermum serotinum</i> (P.G.Mey.) I.Darbysh. & Kiel	Namibia (Kaokoveld)
<i>cleomoides</i> clade	<i>Pogonospermum</i> sect. <i>Aridicola</i> I.Darbysh. & Kiel	17	<i>Pogonospermum cleomoides</i> (S.Moore) I.Darbysh. & Kiel	Southern Africa (most species in Namibia and Northern Cape)

sister to the remainder of the southern African members of this section. *Pogonospermum incanum*, recorded from Botswana, Namibia and South Africa, is notable for having biramous trichomes on the vegetative parts. Although only *P. incanum* has been sampled in the current study, we tentatively hypothesise that, based on morphology, *P. crassiusculum* (P.G.Mey.) I.Darbysh. & Kiel, *P. robustum* (Bond) I.Darbysh. & Kiel and *P. saxatile* (Munday) I.Darbysh. & Kiel may be allied to *P. incanum*, as earlier indicated by Munday (1995). These species all share rather fleshy and narrow, obovate to linear-oblongate or linear-terete leaves, and an indumentum comprising complex trichomes that are either biramous, as in *P. incanum* and sparsely so in *P. saxatile*, or are anvil-shaped, i.e. hairs with a short stalk terminated by a single arm, as in *M. crassiusculum* and *P. robustum* (Munday 1995). It would be desirable to include these species in a future expanded RADseq dataset to confirm or refute their alliance to *P. incanum*. The other species of sect. *Aridicola* lack these complex trichomes on the leaves, although *P. calcaratum* (Schinz) I.Darbysh. & Kiel has branched trichomes on the stems (Munday 1995).

Pogonospermum incanum and its putative allies share a striking resemblance to the southern African *Justicia cuneata* Vahl (see Immelman 1995). *Justicia cuneata* comprises three subspecies, two of which have glabrous leaves, but the third, subsp. *hoerleimiana* (P.G.Mey.) Immelman from southwest Namibia, has dense swollen anvil-shaped trichomes throughout its vegetative portions. *Justicia cuneata* has rarely been collected in fruit and we have not seen mature capsules or seeds of this species; Immelman (1995) describes the capsules as 1-seeded, clavate and hard in texture — an unusual arrangement for *Justicia* and indeed for members of *Justiciinae* in general although, as noted above, indehiscent single-seeded fruits are known in some heterocarpic species of *Justicia* sect. *Harniera* (Hedrén 1989). *Justicia cuneata* has not, to our knowledge, been included in any molecular phylogenetic studies to date and it should be considered a priority for future studies to determine whether it is allied to the *P. incanum* group or if (as is quite possible) this represents a case of convergent evolution.

Nomenclatural Renovations in *Meiosperma* and *Pogonospermum*

Below we provide a species inventory for the two resurrected genera *Meiosperma* and *Pogonospermum*, formalise the necessary new combinations and select lectotypes where required and appropriate. We also formally describe the newly recognised sections within *Pogonospermum*.

It is acknowledged that species delimitation requires further research in some groups of both *Meiosperma* and *Pogonospermum*. Furthermore, some species currently placed within *Justicia* may ultimately

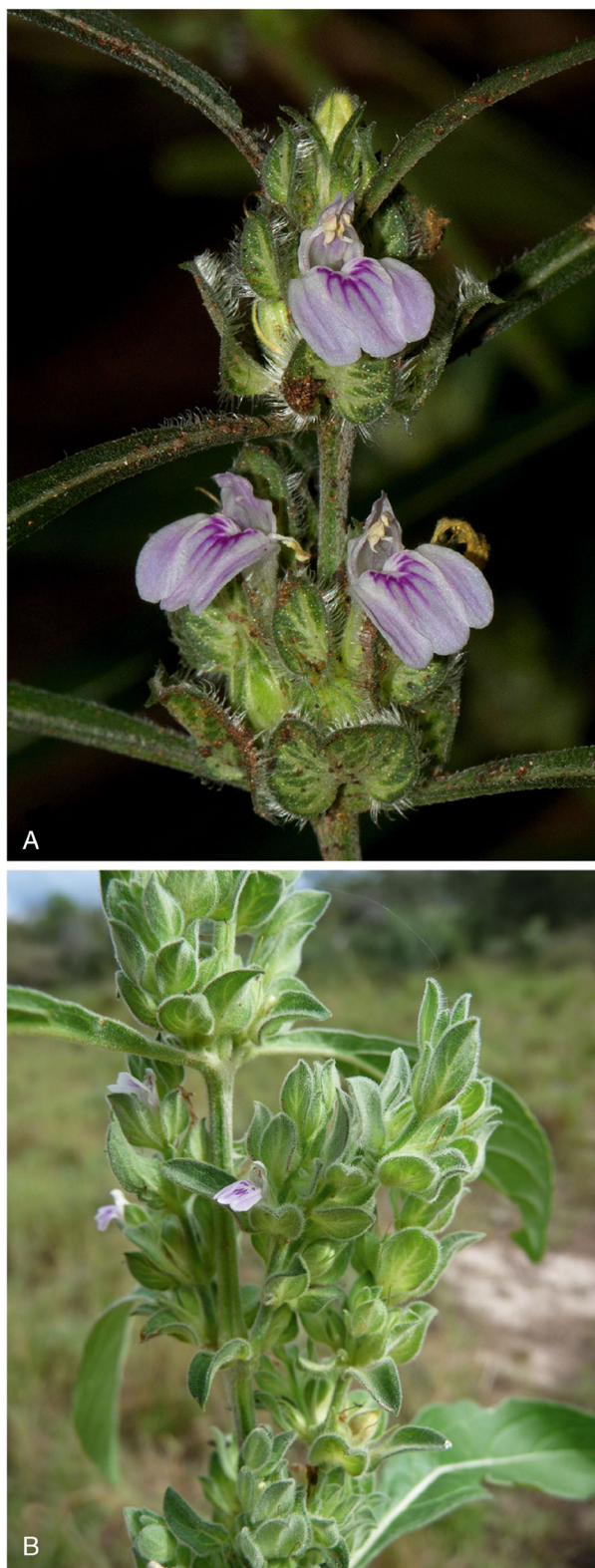


Fig. 2. Representative species of *Meiosperma*. **A** *M. bracteatum* (Mozambique); **B** *M. monechmoides* (Namibia). PHOTOS: **A** B. WURSTEN; **B** E. A. MANZITTO-TRIPP.

prove to be members of one or other of these two genera. For example, it is quite possible that the recently described *Justicia nanofrutex* Champl. (Champluvier 2013) is a member of *Pogonospermum*, however the fruits of this species have not been seen to date.

Meiosperma Raf. (Rafinesque 1838: 64). Type species: *Meiosperma debile* (Forssk.) I.Darbysh. & E.Tripp (basionym: *Dianthera debilis* Forssk.).

Monechma Hochst. (Hochstetter 1841: 374). Type species: *Monechma bracteatum* Hochst., lectotype, selected by Phillips (1951: 715) (= *Meiosperma bracteatum* (Hochst.) I.Darbysh. & E.Tripp), **synon. nov.**

1. [^] ***Meiosperma bracteatum* (Hochst.) I.Darbysh. & E.Tripp comb. nov.**

<http://www.ipni.org/urn:lsid:ipni.org:names:77254328-1>

= *Monechma bracteatum* Hochst., *Flora* 24: 375 (Hochstetter 1841) = *Justicia bracteata* (Hochst.) Zarb (1879: 32). Type: Sudan, Kordofan, Tejara, 19 Nov. 1839, Kotschy 261 (holotype TUB; isotypes GOET* [GOET005559], GZU, HBG* [HBG502284, HBG502285], K! [K000378692], LD* [LD1226235], M* [M0109807], MPU, S* [S09-6163], STU* [STU000468], US* [US01049972]).

Monechma affine Hochst. (Hochstetter 1843: 76).

Monechma angustifolium Nees (1847: 412) = *Justicia debilis* (Forssk.) Vahl var. *angustifolia* (Nees) Oliv. (Oliver 1875: 129) = *Monechma bracteatum* Hochst. var. *angustifolium* (Nees) C.B.Clarke (1900: 215).

Justicia heterostegia T.Thoms. (in Speke 1863: 643).

Justicia blepharostegia E.Mey. ex T.Anderson (1863: 43).

Justicia ukambensis Lindau (1894: 69) = *Monechma ukambense* (Lindau) C.B.Clarke (1900: 220).

Monechma scabrinerve C.B.Clarke (1900: 215).

Monechma bracteatum Hochst. var. *non-strobilifera* C.B.Clarke (1900: 215).

DISTRIBUTION. Africa: Angola, Botswana, D. R. Congo, Eritrea, Ethiopia, Kenya, Malawi, Mozambique, Namibia, Somalia, South Africa, Sudan, Tanzania, Uganda, Zambia, Zimbabwe. Asia: India, Oman, Yemen.

NOTE. This species has often been treated within *Monechma debile* by previous authors; see Vollesen (2010, 2015) for a list of examples.

¹ “^” denotes that the species was sampled in the RADseq study (Darbyshire *et al.* 2020).



Fig. 3. Representative species in the sections of *Pogonospermum*: A sect. *Pogonospermum*: *P. ciliatum* (Mali); B sect. *Savannicola*: *P. depauperatum* (Guinea); C sect. *Virgultorum*: *P. virgultorum* (Angola); D sect. *Tricostatum*: *P. rigidum* (Angola); E sect. *Serotinum*: *P. serotinum* (Namibia); F & G sect. *Aridicola*: F *P. cleomoides* (Namibia), G *P. grandiflorum* (Namibia). PHOTOS: A Q. LUKE; B C. JONGKIND; C, D D. GOYDER; E H. KOLBERG; F I. DARBYSHIRE; G E. A. MANZITTO-TRIPP.

2. *Meiosperma carnosum* (Hedrén) I.Darbysh. & E.Tripp
comb. nov.

<http://www.ipni.org/urn:lsid:ipni.org:names:77254329-1>

= *Justicia carnosa* Hedrén, *Willdenowia* 36: 752 (2006a). Type: Somalia, Banaadir, 2 km from Muqdisho [Mogadishu] airport along road to Jasiira [Gezira], 4 May 1990, Thulin & Hedrén 7167 (holotype UPS; isotypes FT, K! [K000197085]).

DISTRIBUTION. Africa: Somalia.

3. ^ *Meiosperma debile* (Forssk.) I.Darbysh. & E.Tripp
comb. nov.

<http://www.ipni.org/urn:lsid:ipni.org:names:77254330-1>

= *Dianthera debilis* Forssk., *Fl. Aegypt.-Arab.*: 9 (Forsskål 1775) = *Justicia debilis* (Forssk.) Vahl (1791: 15) = *Gendarussa debilis* (Forssk.) Nees (1842: 302) = *Monechma debile* (Forssk.) Nees (1847: 411). Type: Yemen, “Tais”, Forsskål herb. 391 [microfiche 38: II. 3–4] (lectotype C* [C10013032], selected by Wood *et al.*, *Kew Bull.* 83: 444 (1983)).

?*Justicia somalensis* Franch. (Franchet 1882: 53) — see note.

Justicia gregorii S.Moore (1894: 138).

Monechma bracteatum Hochst. var. *hirsutior* C.B.Clarke (1900: 215).

Monechma bracteatum Hochst. var. *stricta* C.B.Clarke (1900: 215).

Monechma troglodyticum Chiov. (Chioventa 1942: 174).

DISTRIBUTION. Africa: Djibouti, Eritrea, Ethiopia, Kenya, Somalia, Sudan, Tanzania. Asia: Saudi Arabia, Yemen.

NOTE. Hedrén (2006b) tentatively placed *Justicia somalensis* Franch. as a synonym of this species but had not seen the type specimen.

4. ^ **Meiosperma eminii** (Lindau) I.Darbysh. & E.Tripp **comb. nov.**

<http://www.ipni.org/urn:lsid:ipni.org:names:77254331-1>

= *Justicia eminii* Lindau, *Bot. Jahrb. Syst.* 20: 68 (1894).

Type: Uganda, “Rubanga”, Mpororo, 20 April [listed as March in protologue] 1891, *Stuhlmann* 2086 (holotype B†; lectotype K! [K000378690], selected here).

Monechma bracteatum Hochst. var. *eciliata* C.B.Clarke (1900: 215) = *M. debile* (Forssk.) Nees var. *eciliata* (Forssk.) Chiov. (Chiovenda 1919: 161).

DISTRIBUTION. Africa: Burundi, D. R. Congo, Malawi, Rwanda, Tanzania, Uganda, Zambia.

NOTE. This species has been treated within *Monechma debile* by some authors; see Vollesen (2010) for examples.

5. ^ **Meiosperma monechmoides** (S.Moore) I.Darbysh. & E.Tripp **comb. nov.**

<http://www.ipni.org/urn:lsid:ipni.org:names:77254332-1>

= *Justicia monechmoides* S.Moore, *J. Bot.* 18: 311 (1880) =

Monechma monechmoides (S.Moore) Hutch. (Hutchinson 1946: 524). Type: Angola, Luanda, Imbondeiro dos Lobos, March 1858 [date fide Hiern 1900], *Welwitsch* 5140 (lectotype BM!, selected by Vollesen (2015: 214); isolectotypes K!, LISU* [LISU223491, LISU223493], P* [P00434925]).

Monechma welwitschii C.B.Clarke (1900: 216), nom. illegit.

Monechma tettense C.B.Clarke (1900: 216).

DISTRIBUTION. Africa: Angola, Botswana, Malawi, Mozambique, Namibia, South Africa, Zambia, Zimbabwe.

NOTES. The exact delimitation of this species and its relation to *Meiosperma bracteatum* requires further consideration. For example, there is a striking form of this species from northeast South Africa with notably large bracts and corollas (e.g. *Codd* 4233, *Strey* & *Schlieben* 8582, both K!) which may be distinct.

This species has been treated within *Monechma debile* by some authors, for example Munday (1995).

6. ^ **Meiosperma tetrasperma** (Hedrén) I.Darbysh. & E.Tripp **comb. nov.**

<http://www.ipni.org/urn:lsid:ipni.org:names:77254334-1>

= *Justicia tetrasperma* Hedrén, *Nordic J. Bot.* 10: 151 (1990). Type: D. R. Congo, Shaba, Marungu, *Vilain* 60 (holotype BRLU).

DISTRIBUTION. Africa: D. R. Congo, Tanzania, Zambia.

Undescribed taxa of *Meiosperma*

^ **Justicia sp. B** of Vollesen (2015: 215).

DISTRIBUTION. Africa: Mozambique.

NOTE. An additional collection of this species has been made since the study of Vollesen (2015) by B. Wursten (BR) and it is confirmed to be an undescribed species (see Darbyshire *et al.* 2020, Fig. 1D); it is currently awaiting description.

Justicia sp. C of Vollesen (2015: 215).

DISTRIBUTION. Africa: Zambia.

Incompletely known taxa in *Meiosperma*

Monechma spissum C.B.Clarke (1900: 219). Type: Angola, Loanda, inter Teba et Quicuxe, March 1854, *Welwitsch* 5066 (holotype BM! [BM000923672]; isotype LISU* [LISU223494]).

DISTRIBUTION. Africa: Vollesen (2015) treated this name as a synonym of *Justicia divaricata* Licht. (= *Pogonospermum divaricatum* (Licht.) I.Darbysh. & Kiel), but the five-lobed calyx (fide Clarke 1900) does not fit with that species, and examination of the type specimen at BM reveals that the seeds of this species match those of *Meiosperma*. It may be a depauperate form of *M. monechmoides* but this requires further investigation. The isotype at LISU represents slightly better material than that at BM.

Pogonospermum Hochst. (Hochstetter 1844: 5). Type species: *Pogonospermum ciliare* (L.f.) Hochst. (*Justicia ciliare* L.f.), (lectotype selected by Pfeiffer 1874: 777) = *P. ciliatum* (Jacq.) I.Darbysh. & Kiel.

NOTE. Pfeiffer (1874) lectotypified *Pogonospermum* with *P. ciliare* by reference to “*Justicia ciliaris* Vahl”. Although Pfeiffer wrongly attributed that name to Vahl rather than to Linnaeus (1781), it seems highly likely that this error was based on reference to Hochstetter (1844) who also attributed *J. ciliaris* to Vahl — see discussion above. Pfeiffer’s lectotypification is therefore acceptable.

Pogonospermum sect. *Pogonospermum*

RECOGNITION. Erect annual herbs. Inflorescences of short or more elongate terminal spikes with bracts markedly to only slightly differentiated from the leaves; bracts, bracteoles and calyx lobes all conspicuously pale-ciliate. Calyx lobes with only the midvein prominent, margins pale-hyaline. Seeds oblate in face view, one side flattened, the other side convex and with a central ridge, with tufts of bristly multicellular trichomes at apex and on one side of hilum at base, the two tufts with trichomes orientated in opposite directions. Fig. 3A.

1. ^ **Pogonospermum ciliatum** (Jacq.) I.Darbysh. & Kiel **comb. nov.**

<http://www.ipni.org/urn:lsid:ipni.org:names:77254446-1>

= *Justicia ciliata* Jacq., *Hort. Bot. Vindob.* 2: 47, t. 104 (Jacquin 1772) = *Dianthera ciliata* (Jacq.) Medik. (Medikus 1783: 9) = *Beloperone ciliata* (Jacq.) Nees (1847: 422) = *Monechma ciliatum* (Jacq.) Milne-Redh. (Milne-Redhead 1934: 304). Type: Illustr. t.104 in *Hort. Bot. Vindob.* 2 (1774), from plant cult. in Vienna.

Justicia ciliaris L.f. (Linnaeus 1781: 84), nom. illegit. = *Pogonospermum ciliare* (L.f.) Hochst. (Hochstetter 1844: 6) = *Schwabea ciliaris* (L.f.) Nees (1847: 384).

Monechma hispidum Hochst. (Hochstetter 1841: 375) = *Pogonospermum hispidum* (Hochst.) Hochst. (Hochstetter 1844: 6).

Schwabea spicigera Nees (1847: 384).

Schwabea spicigera Nees var. β *luxurians* Nees (1847: 384).

Hygrophila lutea T.Anderson (1863: 22).

Ecbolium setaceum Kuntze (1891: 979) = *Dianthera setacea* (Kuntze) Voss (in Siebert & Voss 1896: 809).

Justicia buettneri Lindau (1894: 68).

Justicia togoensis Lindau (1894: 72).

DISTRIBUTION. Africa: Benin, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, D. R. Congo, Gambia, Ghana, Guinea, Guinea Bissau, Ethiopia, Ivory Coast, Malawi, Mali, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, South Sudan, Sudan, Tanzania, Togo, Uganda, Zambia.

Pogonospermum sect. **Savannicola** I.Darbysh. & Kiel **sect. nov.** Type species: *Pogonospermum scabridum* (S.Moore) I.Darbysh. & Kiel.

<http://www.ipni.org/urn:lsid:ipni.org:names:77254447-1>

RECOGNITION. Perennial herbs with a \pm woody base and rootstock. Inflorescences of terminal spikes, sometimes also

with additional spikes in the distalmost leaf axils; bracts markedly differentiated from the leaves, linear, lanceolate, to narrowly elliptic, oblong or oblanceolate; bracts and bracteoles, single-veined or sometimes with the two lateral veins also prominent, margins sometimes markedly paler than rest of surface. Calyx lobes with only the midvein prominent, sometimes with two parallel lateral veins also more faintly visible, margin often pale-hyaline. Seeds \pm oblate in face view, one side flattened, the other side convex and with a central ridge, at first white sericeous-puberulous, these trichomes sometimes sparse or absent on mature seeds. Fig. 3B.

2. ^ **Pogonospermum attenuifolium** (Vollesen) I.Darbysh. & Kiel **comb. nov.**

<http://www.ipni.org/urn:lsid:ipni.org:names:77254448-1>

= *Justicia attenuifolia* Vollesen, *Fl. Trop. E. Africa, Acanth.*: 599 (2010). Type: Tanzania, Tunduru Distr., 95 km on Masasi-Tunduru road, 19 March 1963, Richards 17968 (holotype K! [K000794980]).

DISTRIBUTION. Africa: Mozambique, Tanzania.

3. ^ **Pogonospermum depauperatum** (T.Anderson) I.Darbysh. & Kiel **comb. nov.**

<http://www.ipni.org/urn:lsid:ipni.org:names:77254449-1>

= *Justicia depauperata* T.Anderson, *J. Proc. Linn. Soc., Bot.* 7: 40 (1863) = *Ecbolium depauperatum* (T.Anderson) Kuntze (1891: 980) = *Monechma depauperatum* (T.Anderson) C.B.Clarke (1900: 217). Type: Nigeria, “Onitsha”, without date, Barter 592 [no. not listed in protologue] (lectotype K! [K000378699], selected here). Additional syntype: Nigeria, “Onitsha”, without date, Barter 1300 [no. not listed in protologue] (K! [K000378701]).

Justicia barteri T.Anderson (1863: 39) = *Ecbolium barteri* (T.Anderson) Kuntze (1891: 979).

Justicia sexsulcata Lindau (1894: 67).

Nicoteba marginata Lindau (1895: 119) = *Monechma marginatum* (Lindau) C.B.Clarke (1900: 217).

DISTRIBUTION. Africa: Benin, Cameroon, Central African Republic, D. R. Congo, Ghana, Guinea, Ivory Coast, Mali, Nigeria, Senegal, Sierra Leone, South Sudan, Togo.

4. ^ **Pogonospermum ndellense** (Lindau) I.Darbysh. & Kiel **comb. nov.**

<http://www.ipni.org/urn:lsid:ipni.org:names:77254450-1>

= *Justicia ndellensis* Lindau, *Mém. Soc. Bot. France* 8: 52 (1908) = *Monechma ndellense* (Lindau) J.Miège & Heine (1962: 121). Type: Central African Republic, Dar-Banda oriental, Ndellé, 15 – 20 Dec. 1902, *Chevalier* 6878 (lectotype P* [P00434927], selected here; isolectotypes K! [K000378694], P* [P00434928]).

DISTRIBUTION. Africa: Burkina Faso, Central African Republic, Ghana, Guinea, Mali, Senegal, Sudan, Togo.

NOTE. When transferring this species to *Monechma*, Miège & Heine (1962) noted that it shows considerable variation across its range and that two taxa may be involved. Some particularly striking populations from sandstone outcrops in central Ghana (e.g. *Lock & Hall* in GC 44357, GC!, K!) are noteworthy and are currently under investigation as a potentially new species (I. Darbyshire & G. Ameka, unpubl. data).

5. ^ ***Pogonospermum scabridum*** (S.Moore) I.Darbysh. & Kiel comb. nov.

<http://www.ipni.org/urn:lsid:ipni.org:names:77254451-1>

= *Justicia scabrida* S.Moore, *J. Bot.* 18: 310 (1880) = *Monechma scabridum* (S.Moore) C.B.Clarke (1900: 217). Type: Angola, Pungo Andongo, 11 March 1857, *Welwitsch* 5092 (lectotype BM! [BM000923677], selected by Vollesen (2015: 222); isolectotypes K! [K000378724], LISU* [LISU223487]).

Justicia marginata Lindau (1894: 73).

DISTRIBUTION. Africa: Angola, D. R. Congo, Zambia.

6. ^ ***Pogonospermum subsessile*** (Oliv.) I.Darbysh. & Kiel comb. nov.

<http://www.ipni.org/urn:lsid:ipni.org:names:77254452-1>

= *Justicia subsessilis* Oliv., *Trans. Linn. Soc. London* 29: 129, t.129b (Oliver 1875) = *Monechma subsessile* (Oliv.) C.B.Clarke (1900: 216). Type: Tanzania, Bukoba Prov., Karagwe, 2 Dec. 1861, *Speke & Grant* 213 (holotype K! [K000378735]).

Justicia simplicispica C.B.Clarke (1900: 188).

Monechma nemoralis S.Moore (1909: 296).

DISTRIBUTION. Africa: Angola, Burundi, D. R. Congo, Kenya, Rwanda, Tanzania, Uganda, Zambia, Zimbabwe.

Pogonospermum* sect. *Virgultorum I.Darbysh. & Kiel sect. nov. Type species: *Pogonospermum virgultorum* (S.Moore) I.Darbysh. & Kiel.

<http://www.ipni.org/urn:lsid:ipni.org:names:77254453-1>

RECOGNITION. Perennial herbs or shrublets with a woody base and rootstock. Inflorescences terminal or mixed axillary and terminal spikes or pedunculate axillary fascicles; bracts markedly differentiated from the leaves, small, linear, lanceolate or proximal pairs elliptic or obovate. Calyx lobes with only the midvein prominent, the two parallel lateral veins inconspicuous or not visible. Seeds ± globose in face view, only slightly flattened, glabrous. Fig. 3C.

7. ^ ***Pogonospermum fanshawei*** (Vollesen) I.Darbysh. & Kiel comb. nov.

<http://www.ipni.org/urn:lsid:ipni.org:names:77254454-1>

= *Justicia fanshawei* Vollesen, *Fl. Zamb.* 8 (6): 220 (2015). Type: Zambia, Mansa (Fort Rosebery) Distr., 5 May 1964, *Fanshawe* 8576 (holotype K! [K000918638]; isotype NDO).

DISTRIBUTION. Africa: Zambia.

NOTE. This species is unusual in *Pogonospermum* in having small pedunculate fascicles of flowers, sometimes restricted to the distal leaf axils, but in some cases the inflorescence becomes slightly more elongate and secund-spiceiform as in *P. virgultorum*.

8. ^ ***Pogonospermum virgultorum*** (S.Moore) I.Darbysh. & Kiel comb. nov.

<http://www.ipni.org/urn:lsid:ipni.org:names:77254455-1>

= *Monechma virgultorum* S.Moore, *J. Bot.* 49: 311 (1911) = *Justicia virgultorum* (S.Moore) I.Darbysh. & Goyder (Darbyshire & Goyder 2019: 106). Type: Angola, Cuando Cubango, Cassuango, Cuiriri, 26 March 1906, *Gossweiler* 3679 (holotype BM! [BM000923667]).

Monechma carrissoi Benoist (1950: 30).

DISTRIBUTION. Africa: Angola.

Pogonospermum* sect. *Tricostatum I.Darbysh. & Kiel sect. nov. Type species: *Pogonospermum tricostatum* (Vollesen) I.Darbysh. & Kiel.

<http://www.ipni.org/urn:lsid:ipni.org:names:77254456-1>

RECOGNITION. Perennial herbs with a ± woody base and rootstock. Inflorescences of terminal spikes, sometimes also with additional spikes in the distalmost leaf axils; bracts markedly differentiated from the leaves, linear or lanceolate to narrowly oblanceolate. Calyx

lobes (and usually also bracts and bracteoles) with three veins prominent and often also differently coloured to the paler intercostal surface. Seeds ± globose in face view, only slightly flattened, glabrous. Fig. 3D.

9. [^] **Pogonospermum cubangense** (*I.Darbysh. & Goyder*) *I.Darbysh. & Kiel comb. nov.*

<http://www.ipni.org/urn:lsid:ipni.org:names:77254457-1>

= *Justicia cubangensis* I.Darbysh. & Goyder, *Blumea* 64: 100 (2019). Type: Angola, Cuando Cubango Province, Cuchi River Gorge (Cubango drainage), c. 7 km N of Cuchi, 28 May 2015, *Goyder* 8068 (holotype K! [K001333210]; isotypes CAS!, INBAC, LUBA).

DISTRIBUTION. Africa: Angola.

10. **Pogonospermum eriniaie** (*I.Darbysh.*) *I.Darbysh. & Kiel comb. nov.*

<http://www.ipni.org/urn:lsid:ipni.org:names:77254458-1>

= *Justicia eriniaie* I.Darbysh., *Blumea* 64: 101 (in Darbyshire & Goyder 2019). Type: Angola, Namibe Prov., between Bibala and Assunção, 10 April 2017, *Tripp & Dexter* 6917 (holotype K! [K001322688]; isotypes COLO!, LUBA!).

DISTRIBUTION. Africa: Angola.

11. **Pogonospermum glaucifolium** (*S.Moore*) *I.Darbysh. & Kiel comb. nov.*

<http://www.ipni.org/urn:lsid:ipni.org:names:77254459-1>

= *Monechma glaucifolium* S.Moore, *J. Bot.* 49: 310 (1911) = *Justicia glaucifolia* (S.Moore) I.Darbysh. & Goyder (Darbyshire & Goyder 2019: 105). Type: Angola, without precise locality or date, *Gossweiler* s.n. (holotype BM! [BM000923665]).

DISTRIBUTION. Africa: Angola.

12. **Pogonospermum loliooides** (*S.Moore*) *I.Darbysh. & Kiel comb. nov.*

<http://www.ipni.org/urn:lsid:ipni.org:names:77254460-1>

= *Justicia loliooides* S.Moore, *J. Bot.* 18: 310 (1880) = *Monechma loliooides* (S.Moore) C.B.Clarke (1900: 218). Type: Angola, Malange, Distr. Pungo

Andongo, de Mata de Mutollo, Jan. 1857, *Welwitsch* 5178 (lectotype BM! [BM000923676], selected by Darbyshire & Goyder (2019: 105); isolectotypes C* [C10000041], K! [K000378722], LD* [LD1569502], LISU* [LISU223483]).

12a. **Pogonospermum loliooides** (*S.Moore*) *I.Darbysh. & Kiel var. loliooides*

DISTRIBUTION. Africa: Angola.

12b. **Pogonospermum loliooides** (*S.Moore*) *I.Darbysh. & Kiel var. latifolium* (*S.Moore*) *I.Darbysh. & Kiel comb. nov.*

<http://www.ipni.org/urn:lsid:ipni.org:names:77254462-1>

= *Justicia loliooides* S.Moore var. *latifolia* S.Moore, *J. Bot.* 18: 310 (1880). Type: Angola, Malange, Distr. Pungo Andongo, inter Quisonde et Condo, March 1857, *Welwitsch* 5099 (lectotype BM! [BM000923675], selected by Darbyshire & Goyder (2019: 105); isolectotypes C* [C10000039], K! [K000378723], LD* [LD1575500]).

DISTRIBUTION. Africa: Angola.

13. **Pogonospermum laetum** (*S.Moore*) *I.Darbysh. & Kiel comb. nov.*

<http://www.ipni.org/urn:lsid:ipni.org:names:77254463-1>

= *Justicia laeta* S.Moore, *J. Bot.* 18: 311 (1880). Type: Angola, Pungo Andongo, inter Condo et Quisonde, March 1857, *Welwitsch* 5108 (lectotype BM! [BM000839214], selected by Darbyshire & Goyder (2019: 105); isolectotype K! [K000419259]).

DISTRIBUTION. Africa: Angola.

NOTE. This species is placed tentatively in *Pogonospermum* sect. *Tricostatum* based on the spiciform inflorescences and 3-veined calyx lobes, but molecular evidence is needed to confirm this; see Darbyshire & Goyder (2019) for further discussion on its placement.

14. [^] **Pogonospermum rigidum** (*S.Moore*) *I.Darbysh. & Kiel comb. nov.*

<http://www.ipni.org/urn:lsid:ipni.org:names:77254464-1>

= *Monechma rigidum* S.Moore, *J. Bot.* 49: 310 (1911). Type: Angola, Menongue [Munongue], April 1906,

Gossweiler 3355 (lectotype BM! [BM00092362], selected by Darbyshire & Goyder (2019: 106); isolectotype K! [K001009703]).

Justicia moorei I.Darbysh. & Goyder (Darbyshire & Goyder 2019: 106).

DISTRIBUTION. Africa: Angola.

15. ^ ***Pogonospermum tricostatum*** (Vollesen) I.Darbysh. & Kiel **comb. nov.**

<http://www.ipni.org/urn:lsid:ipni.org:names:77254465-1>

= *Justicia tricostata* Vollesen, *Fl. Trop. E. Africa, Acanth.*: 598 (2010). Type: Tanzania, Sumbawanga Distr., Tataka Mission, 24 Feb. 1994, Bidgood *et al.* 2431 (holotype K! [K000794981]; isotypes BR* [BR0000005737499], DSM, EA, K! [K000794982], MO, NHT, P, WAG).

DISTRIBUTION. Africa: Tanzania, Zambia.

Pogonospermum* sect. *Serotinum I.Darbysh. & Kiel **sect. nov.** Type species: *Pogonospermum serotinum* (P.G.Mey.) I.Darbysh. & Kiel.

<http://www.ipni.org/urn:lsid:ipni.org:names:77254466-1>

RECOGNITION. Shrublet with dense branching, mature branches woody; leaves with lateral veins prominent and arching strongly towards apex, often leaves appearing tripliveined. Inflorescences of lax terminal spikes; bracts (at least distally) markedly differentiated from the leaves, narrowly elliptic or lanceolate. Calyx lobes with only midvein prominent. Seeds compressed, one side ± flat, the other side convex, glabrous. Fig. 3E.

16. ^ ***Pogonospermum serotinum*** (P.G.Mey.) I.Darbysh. & Kiel **comb. nov.**

<http://www.ipni.org/urn:lsid:ipni.org:names:77254468-1>

= *Monechma serotinum* P.G.Mey., *Mitt. Bot. Staatssamml. München* 11: 112 (Meyer 1973) = *Justicia serotina* (P.G.Mey.) J.C.Manning & Goldblatt (2014: 46). Type: Namibia, Kaokoveld, zwischen Etengua und Otjitanda, 5 July 1969, Meyer 1245 (holotype M* [M0109802]; isotypes M* [M0109803], PRE, WIND! [WIND000032567]).

DISTRIBUTION. Africa: Namibia.

Pogonospermum* sect. *Aridicola I.Darbysh. & Kiel **sect. nov.** Type species: *Pogonospermum cleomoides* (S.Moore) I.Darbysh. & Kiel.

<http://www.ipni.org/urn:lsid:ipni.org:names:77254467-1>

RECOGNITION. Shrublets, perennial herbs or more rarely annual herbs, often with intricate branching, mature branches sometimes woody and gnarled, foliage often dense. Inflorescences of axillary single-flowered cymes, bracts undifferentiated from the leaves or only slightly differentiated, flowers sometimes together forming a poorly defined, leafy terminal spike. Calyx lobes with only midvein prominent or with no veins prominent, margins sometimes hyaline. Seeds rounded or ovate in face view, one side flat or concave to slightly convex, the other side more markedly convex and usually with a central ridge, sometimes mottled or intricately patterned, glabrous. Fig. 3F & G.

17. ^ ***Pogonospermum australe*** (P.G.Mey.) I.Darbysh. & Kiel **comb. nov.**

<http://www.ipni.org/urn:lsid:ipni.org:names:77254469-1>

= *Monechma australe* P.G.Mey., *Mitt. Bot. Staatssamml. München* 3: 602 (1960) = *Monechma genistifolium* (Engl.) C.B.Clarke subsp. *australe* (P.G.Mey.) Munday (1995: 54) = *Justicia genistifolia* Engl. subsp. *australis* (P.G.Mey.) J.C.Manning & Goldblatt (2014: 46) = *Justicia australis* (P.G.Mey.) Vollesen (2015: 219). Type: Namibia, Distr. Gibeon, Farm Haribes [Harabies], 7 April 1956, Volk 12244 (holotype M* [M-0109813]).

DISTRIBUTION. Africa: Namibia, South Africa.

18. ^ ***Pogonospermum calcaratum*** (Schinz) I.Darbysh. & Kiel **comb. nov.**

<http://www.ipni.org/urn:lsid:ipni.org:names:77254470-1>

= *Monechma calcaratum* Schinz, *Vierteljahrsschr. Naturf. Ges. Zürich* 61: 441 (1916). Type: Namibia, Gross Namaland, Anab R., 5 Sept. 1897, Dinter 1060 (holotype Z* [Z-000030966]).

Justicia namibensis J.C.Manning & Goldblatt (2014: 46).

DISTRIBUTION. Africa: Namibia.

19. ***Pogonospermum callothamnum*** (Munday) I.Darbysh. & Kiel **comb. nov.**

<http://www.ipni.org/urn:lsid:ipni.org:names:77254471-1>

= *Monechma callothamnum* Munday, *S. African J. Bot.* 53: 140 (1987) = *Justicia callothamnum* (Munday) J.C.Manning & Goldblatt (2014: 46). Type: Namibia, Bethanie Distr., Zaracheibis, 27 Sept. 1972, Merxmüller & Giess 28867 (holotype PRE* [PRE0141079-0]; isotypes M* [M-0109810], WIND! [WIND000072662]).

DISTRIBUTION. Africa: Namibia.

20. ^ **Pogonospermum cleomoides** (S.Moore) I.Darbysh. & Kiel **comb. nov.**

<http://www.ipni.org/urn:lsid:ipni.org:names:77254472-1>

= *Justicia cleomoides* S.Moore, *J. Bot.* 18: 313 (1880) = *Monechma cleomoides* (S.Moore) C.B.Clarke (1900: 220). Type: Angola, “inter Mossamedes et Cavalheiros”, July 1859, Welwitsch 5006 (lectotype BM! [BM000923669], selected here; isolectotypes C* [C10000038], K! [K000378715], LD* [LD1684006], LISU* [LISU223503], P* [P00434923]).

Justicia arenicola Engl. (Engler 1888: 264) = *Ecbolium arenicola* (Engl.) Kuntze (1891: 980) = *Monechma arenicola* (Engl.) C.B.Clarke (1900: 288).

Monechma tonsum P.G.Mey. (Meyer 1957: 304). = *Justicia tonsa* (P.G.Mey.) J.C.Manning & Goldblatt (2014: 46), **synon. nov.**

DISTRIBUTION. Africa: Angola, Namibia.

NOTE. *Monechma tonsum* is included in the synonymy of *P. cleomoides* in light of the findings in Darbyshire *et al.* (2020); see discussion in that publication.

21. **Pogonospermum crassiusculum** (P.G.Mey.) I.Darbysh. & Kiel **comb. nov.**

<http://www.ipni.org/urn:lsid:ipni.org:names:77254473-1>

= *Monechma crassiusculum* P.G.Mey., *Mitt. Bot. Staatssamml. München* 3: 604 (Meyer 1960) = *Justicia crassiuscula* (P.G.Mey.) J.C.Manning & Goldblatt (2014: 46). Type: Namibia, Kahanstal, Dec. 1934, Dinter 8141 (holotype M* [M0109808]; isotypes HBG* [HBG502290], K! [K000378766], M* [M0109809], PRE* [PRE0143449-0], S* [S09-

6183], WIND! [WIND000032315], Z).

DISTRIBUTION. Africa: Namibia.

22. ^ **Pogonospermum desertorum** (Engl.) I.Darbysh. & Kiel **comb. nov.**

<http://www.ipni.org/urn:lsid:ipni.org:names:77254474-1>

= *Justicia desertorum* Engl., *Bot. Jahrb. Syst.* 10: 263 (Engler 1888) = *Ecbolium desertorum* (Engl.) Kuntze (1891: 980) = *Monechma desertorum* (Engl.) C.B.Clarke (1900: 218). Type: Namibia, Husab, June 1886, Marloth 1462 (holotype B†; isotypes BOL, GH* [GH00217460], GRA* [GRA0002787-0], K! [K000378771], PRE* [PRE0143451-0, PRE0593969-0]).

DISTRIBUTION. Africa: Namibia.

23. ^ **Pogonospermum divaricatum** (Licht.) I.Darbysh. & Kiel **comb. nov.**

<http://www.ipni.org/urn:lsid:ipni.org:names:77254475-1>

= *Justicia divaricata* Licht. in Roem. & Schult., *Syst. Veg.* ed. 15, 1: 163 (Roemer & Schultes 1817). Type: South Africa, Grootrivierspoort, without date, Lichtenstein s.n. [Herb. Willdenow no. 355] (holotype B* [B-W 00355 -01 0]).

Gendarussa incana Nees var. *villosa* Nees (1841: 368).

Adhatoda capensis (Thunb.) Nees var. *arenosa* Nees (1847: 391).

Adhatoda divaricata Nees (1847: 391) = *Justicia divaricata* (Nees) T.Anderson (1863: 42) = *Monechma divaricatum* (Nees) C.B.Clarke (1901: 72).

Justicia mossamedea S.Moore (1880: 312).

Justicia nepeta S.Moore (1880: 312) = *Monechma nepetum* (S.Moore) C.B.Clarke (1900: 219).

Justicia namaensis Schinz (1890: 202) = *Monechma namaense* (Schinz) C.B.Clarke (1901: 73).

Ecbolium villosum Kuntze (1891: 978).

Monechma floridum C.B.Clarke (1900: 219).

Monechma fimbriatum C.B.Clarke (1901: 72).

Monechma nepetoides C.B.Clarke (1901: 73).

Monechma angustissimum S.Moore (1903: 137).

Monechma eremum S.Moore (1907: 231).

Monechma terminale S.Moore (1908: 75).

Monechma quintasii Benoist (1950: 37), **synon. nov.**

DISTRIBUTION. Africa: Angola, Botswana, Eswatini, Mozambique, Namibia, South Africa, Zambia, Zimbabwe.

NOTE. The multiple synonyms reflect the considerable variation within this widespread species, but it was found to be monophyletic in the RADseq study of Darbyshire *et al.* (2020).

24. **Pogonospermum distichotrichum** (Lindau) I.Darbysh. & Kiel **comb. nov.**

<http://www.ipni.org/urn:lsid:ipni.org:names:77254476-1>

= *Justicia distichotricha* Lindau, *Bot. Jahrb. Syst.* 43: 357 (1909) = *Monechma distichotrichum* (Lindau) P.G.Mey. (Meyer 1961: 66). Type: Namibia, Knibis [Kuibis] R., July 1907, Range 380 (holotype B†; isotypes BOL, SAM).

DISTRIBUTION. Africa: Namibia, South Africa.

25. [^] **Pogonospermum genistifolium** (Engl.) I.Darbysh. & Kiel **comb. nov.**

<http://www.ipni.org/urn:lsid:ipni.org:names:77254477-1>

= *Justicia genistifolia* Engl., *Bot. Jahrb. Syst.* 10: 264 (Engler 1888) = *Ecbolium genistifolium* (Engl.) Kuntze (1891: 487) = *Monechma genistifolium* (Engl.) C.B.Clark (1900: 218). Type: Namibia, Karibib, May 1886, Marloth 1424 (holotype B†; isotypes BOL, GRA* [GRA0002785-0], K! [K000378765], M* [M0109804], SAM* [SAM0042885-0]).
Justicia hereroensis Engl. (Engler 1888: 264) = *Ecbolium hereroense* (Engl.) Kuntze (1891: 980) = *Monechma hereroense* (Engl.) C.B.Clark (1900: 220).

DISTRIBUTION. Africa: Namibia.

26. [^] **Pogonospermum grandiflorum** (Schinz) I.Darbysh. & Kiel **comb. nov.**

<http://www.ipni.org/urn:lsid:ipni.org:names:77254478-1>

= *Monechma grandiflorum* Schinz, *Vierteljahrsschr. Naturf. Ges. Zürich* 61: 442 (1916). Type: Namibia, Gross Namaland, [south of] Rehoboth, 1891, Fleck 537 (lectotype Z* [Z-000000101] selected here; isolectotype Z* [Z-000000102]).

Justicia fleckii J.C.Manning & Goldblatt (2014: 46).

DISTRIBUTION. Africa: Namibia.

27. [^] **Pogonospermum incanum** (Nees) I.Darbysh. & Kiel **comb. nov.**

<http://www.ipni.org/urn:lsid:ipni.org:names:77254479-1>

= *Gendarussa incana* Nees, *Linnaea* 15: 367 (1841) excl. var. *villosa* = *Adhatoda incana* (Nees) Nees (1847: 393) = *Justicia incana* (Nees) T.Anderson (1863: 42) = *Ecbolium incanum* (Nees) Kuntze (1891: 980) = *Monechma incanum* (Nees) C.B.Clark (1901: 69). Type: South Africa, Nieuweveld, Drège s.n. (lectotype K!, selected by Vollesen (2015: 219), see note). Additional syntype: South Africa, “circa Graaff-Reinet; in Karro [Karoo], prope castellum Beaufort”, Ecklon 280 (BOL).

DISTRIBUTION. Africa: Botswana, Namibia, South Africa. **NOTE.** When lectotypifying *Gendarussa incana*, Vollesen (2015) referred to the collecting locality for the Drège lectotype as “between Beaufort West and Rhinoster Kop”. This locality information was added to the sheet by Charles Baron Clarke; the original specimen cites only “Cape, Drège” and the protologue gives the collecting locality as “Nieuweveld”.

28. [^] **Pogonospermum leucoderme** (Schinz) I.Darbysh. & Kiel **comb. nov.**

<http://www.ipni.org/urn:lsid:ipni.org:names:77254480-1>

= *Justicia leucodermis* Schinz, *Verh. Bot. Vereins Prov. Brandenburg* 31: 202 (1890) = *Monechma leucoderme* (Schinz) C.B.Clark (1901: 70). Type: Namibia, Gross Namaland, zwischen Tiras und Rehoboth, 1885, Schinz 85 [no. not listed in protologue] (lectotype Z* [Z000030986], selected here; ?isolectotype K! [K000378707], labelled as Schinz 1). Additional syntype: Namibia, Tsiarub-Gebirge, 1884, Schinz 84 [no. not listed in protologue] (Z* [Z000075019], ZT* [ZT00009912]; K! [K000378708], labelled as Schinz 29).

DISTRIBUTION. Africa: Namibia.

29. [^] **Pogonospermum mollissimum** (Nees) I.Darbysh. & Kiel **comb. nov.**

<http://www.ipni.org/urn:lsid:ipni.org:names:77254481-1>

= *Adhatoda mollissima* Nees in de Candolle, *Prodr.* 11: 391 (1847) = *Monechma mollissimum* (Nees) P.G.Mey. (Meyer 1957: 304). Type: South Africa, 1837, Drège s.n. (lectotype K! [K000378762], selected here; isolectotypes K! [K000378763], PRE).

Monechma molle E. Mey. ex C.B. Clarke (1901: 69).
Justicia dregei J.C. Manning & Goldblatt (2014: 46).

DISTRIBUTION. Africa: Namibia, South Africa.

NOTE. The two type specimens at K are mounted on the same sheet; K000378762 derives from Hooker's herbarium whilst K000378763 is from Bentham's herbarium. As Nees states that he saw the collection in Hooker's herbarium, the former is here selected as lectotype. Additional collecting locality information, believed to have been added at a later date by Charles Baron Clarke, is noted on both the Kew specimens: "between Holgat River and the Orange River. [alt.] 1000 – 1500 ft. Little Namaqualand". Nees also saw a duplicate in "h. Drèg[e]" that is here assumed to have been in Berlin and was likely to have been destroyed during World War II.

30. ^ **Pogonospermum patulum** (Licht.) I. Darbysh. & Kiel **comb. nov.**

<http://www.ipni.org/urn:lsid:ipni.org:names:77254482-1>

= *Justicia patula* Licht. in Roem. & Schult., *Syst. Veg.*, ed. 15 bis 1: 164 (Roemer & Schultes 1817) = *Gendarussa patula* (Licht.) Nees (1841: 367) = *Adhatoda patula* (Licht.) Nees (1847: 393) = *Ecbolium patulum* (Licht.) Kuntze (1891: 981). Type: South Africa, "in collibus trans fluvium tkai garieb [Orange River] prope vadum incolis Priskab [Prieska] dictum, ad promont. B. Spei", without date, *Lichtenstein* s.n. (holotype B* [B-W 00357-01 0]).

Justicia spartioides T. Anderson (1863: 43) = *Ecbolium spartioides* (T. Anderson) Kuntze (1891: 981) = *Monechma spartioides* (T. Anderson) C.B. Clarke (1901: 72), **synon. nov.**

Justicia atherstonei T. Anderson (1863: 42) = *Ecbolium atherstonei* (T. Anderson) Kuntze (1891: 980) = *Monechma atherstonei* (T. Anderson) C.B. Clarke (1901: 72), **synon. nov.**

Monechma pseudopatulum C.B. Clarke (1901: 70), **synon. nov.**

Monechma pseudopatulum C.B. Clarke var. *latifolium* C.B. Clarke (1901: 70), **synon. nov.**

DISTRIBUTION. Africa: Namibia, South Africa.

NOTE. This species is well known as *Monechma spartioides* (see e.g. Munday 1995), but the earliest validly published name for this species is *Justicia patula* Licht. in Roemer & Schultes (1817).

31. **Pogonospermum robustum** (Bond) I. Darbysh. & Kiel **comb. nov.**

<http://www.ipni.org/urn:lsid:ipni.org:names:77254483-1>

= *Monechma robustum* Bond, *J. S. African Bot.* 6: 67 (in Compton & Bond 1940). Type: South Africa, Western Cape, Ladismith Distr., Witespoort, 12 Sept. 1938, *Compton* 7350 (holotype NBG* [NBG0048649-0]; isotypes BOL, PRE* [PRE0145884-0]).

Justicia karroica J.C. Manning & Goldblatt (2014: 46).

DISTRIBUTION. Africa: South Africa.

32. ^ **Pogonospermum salsola** (S. Moore) I. Darbysh. & Kiel **comb. nov.**

<http://www.ipni.org/urn:lsid:ipni.org:names:77254484-1>

= *Justicia salsola* S. Moore, *J. Bot.* 18: 340 (1880) = *Monechma salsola* (S. Moore) C.B. Clarke (1900: 220). Type: Angola, Mossamedes, Praia da Amelia, July 1859, *Wekwitsch* 5023 (lectotype BM* [BM 000923670], selected here; isolectotypes K! [K000378716], P* [P00434932]).

DISTRIBUTION. Africa: Angola, Namibia.

33. **Pogonospermum saxatile** (Munday) I. Darbysh. & Kiel **comb. nov.**

<http://www.ipni.org/urn:lsid:ipni.org:names:77254485-1>

= *Monechma saxatile* Munday, *S. African J. Bot.* 3: 363 (1984) = *Justicia saxatilis* (Munday) J.C. Manning & Goldblatt (2014: 46). Type: South Africa, Northern Cape, about 8 km N of Pofadder, 16 June 1948, *Acocks* 14394 (holotype PRE; isotype K! [K000378761]).

DISTRIBUTION. Africa: South Africa.

Pogonospermum incertae sedis

34. **Pogonospermum kasamae** (Vollesen) I. Darbysh. & Kiel **comb. nov.**

<http://www.ipni.org/urn:lsid:ipni.org:names:77254486-1>

= *Justicia kasamae* Vollesen, *Fl. Zamb.* 8 (6): 222 (2015). Type: Zambia, Kasama, 1 July 1964, *Fanshawe* 8774 (holotype K! [K000743643]; isotype NDO).

DISTRIBUTION. Africa: Zambia.

NOTE. In the protologue for this species, Vollesen (2015) records the seeds as “mottled grey and black, c. 3.5 × 4 mm, whitish sericeous or densely so on edges, sparser on flanks, glabrescent” (p. 223). This would place this species in sect. *Savannicola*. However, our observations on the K material of this species have found the seeds to be glabrous, even when immature. The broad, elliptic or obovate bracts in this species are unusual in the genus, and its infrageneric placement is uncertain at present.

Undescribed species of *Pogonospermum*

Pogonospermum sp. aff. *ndellense* (see note under *P. ndellense*, sp. 4 above).

DISTRIBUTION. Africa: Ghana.

Justicia sp. H of Vollesen (2010: 598).

DISTRIBUTION. Africa: Tanzania.

NOTE. This species is known only from a single flowering collection, *Leedal* 4092 (K!) from Umalila District in southern Tanzania. Although Vollesen (2010) compared this species to *Justicia varians* (C.B.Clarke) Vollesen which is now placed in *Justicia* sect. *Tyloglossa* (Hochst.) Lindau (see below), the prominently 3-veined bracts, bracteoles and calyx lobes suggest affinity with *Pogonospermum* sect. *Tricostatum* and the leaf venation is also reminiscent of some species in this section. Further material, including fruits, is required to confirm this placement.

Excluded taxa

Monechma acutum C.B.Clarke (1901: 71) = **Justicia acuta** (C.B.Clarke) Fourc. (Fourcade 1941: 6).

NOTE. The type specimens at Kew, *Burchell* 4761, 4785 (together on the same sheet) have been annotated by P. G. Meyer in 1959 as “*Justicia*, near *J. orchidoides* L. f.”; we concur with this placement.

Monechma clarkei Schinz (1916: 440) = **Justicia guerkeana** Schinz (1890: 201).

NOTE. *Justicia guerkeana* Schinz is morphologically close to *J. platysepala* (see below) and does not belong within either *Meiosperma* or *Pogonospermum*. Amongst other differences, it has densely tuberculate seeds.

Monechma foliosum C.B.Clarke (1901: 73).

NOTE. The original material of this species includes three specimens, one of which (*Bolus* 1873, K000378767) is a mixed collection consisting of *Pogonospermum patulum* plus a species of *Justicia*. The most informative of the three syntypes, *Bolus* 2422 (K000378768) closely resembles *Justicia cuneata* Vahl and may be of that species.

Monechma linaria (T.Anderson) C.B.Clarke (1901: 70) = **Justicia linaria** T.Anderson (1863: 42).

NOTE. The type specimen (*Drège* s.n., K) is depauperate and lacks fruits, but P. G. Meyer in 1959 annotated it as “probably *Justicia* near *orchidoides* L.f.” and we concur with this conclusion.

Monechma pilosella Nees (1847: 412) = **Justicia pilosella** (Nees) Hilsenb. (Hilsenbeck 1990: 225).

NOTE. This neotropical species is not morphologically close to either of the paleotropical genera *Meiosperma* or *Pogonospermum*.

Monechma platysepalum S.Moore (1907: 231) = **Justicia platysepala** (S.Moore) P.G.Mey. (Meyer 1956: 170).

NOTE. *Justicia platysepala* is morphologically similar to *J. guerkeana* (see note to *M. clarkei* above) and the RADseq phylogeny of Darbyshire *et al.* (2020) confirms that *J. platysepala* is not allied to either *Meiosperma* or *Pogonospermum*.

Monechma praecox Milne-Redh. (Milne-Redhead 1937: 430) = **Justicia bequaertii** De Wild. (De Wildeman 1914: 429).

NOTE. This name is treated as a synonym of *Justicia bequaertii* De Wild. (see Champluvier 2013; Vollesen 2015). Milne-Redhead (1937) considered this species to be intermediate between *Monechma* and *Justicia* as it has a 2-seeded capsule but with sculptured seeds. However, the seed sculpturing together with the long-stipitate capsule with rounded fertile portion place this outside of either *Meiosperma* or *Pogonospermum*.

Monechma varians C.B.Clarke (1900: 216) = **Justicia varians** (C.B.Clarke) Vollesen (2015: 221).

NOTE. This species was placed outside of the two “*Monechma*” clades in the RADseq phylogeny of Darbyshire *et al.* (2020) and is now considered to be allied to *Justicia linearispica* C.B.Clarke in the *Tyloglossa*

clade of *Justicia* (Darbyshire *et al.* 2020).

Monechma violaceum (Vahl) Nees (1847: 411) = *Megalochlamys violacea* (Vahl) Vollesen (1989: 608).

NOTE. This species is a member of the genus *Megalochlamys* in the *Tetramerium* lineage of Acanthaceae (McDade *et al.* 2018).

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