# Notes on the taxonomy of *Parakeelya* Hershk. (Montiaceae)

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***Abstract*- The genus *Parakeelya* Hershk. was erected in 1999 to accommodate a clade of Australian species traditionally classified in classical polyphyletic *Calandrinia* Kunth s. lato. Nonetheless, Australian specialists and most taxonomic references worldwide continued to use the name *Calandrinia*. Earlier, in 1987, Roger Carolin concluded that the monotypic genus *Rumicastrum* Ulb. is a species of Australian calandrinia, and this name is older than *Parakeelya*, hence has priority as the generic name for the Australian species. Subsequent Australian specialists did not adopt this usage, either. In 2018, phylogenomic data demonstrated definitively that *Rumicastrum* pertains to the Australian clade, hence that this is the correct generic name. A catalog of *Rumicastrum* combinations of all of the species was published, and these names were accepted in the most important global taxonomic references. However, the Australian specialists formally proposed to conserve the name *Parakeelya* over *Rumicastrum*. Despite egregious data errors in the proposal and technical disqualification of two of its three principal arguments, this conservation has been accepted. The present work provides the necessary nomenclatural recombinations in *Parakeelya*, and also names a new species. The storied saga of the taxonomy of this genus is reviewed.**

***Key words*: *Calandrinia, Parakeelya, Rumicastrum*, Montiaceae, Australia**

## Introduction

Hershkovitz (1999 [“1998”]; see also Hershkovitz, 2002) published the generic name *Parakeelya* Hershk., comprising a genus of, at that time, 35 Australian endemic species of plants then classified in *Calandrinia* Kunth s. l. (e.g., by McNeill, 1974).[1] This classification was accepted by some, but not all taxonomic references (e.g., Nyffeler & Eggli, 2010; Hernández-Ledesma et al., 2015). Meanwhile, *Calandrinia* s. str. comprises a small clade of western American species whose monophyly is unambiguously and uncontroversially supported by morphological and genomic evidence (Hershkovitz, 1993a, 2006, 2019; Hershkovitz & Zimmer, 2000; Ogburn & Edwards, 2015; Hancock et al., 2018).

Australian specialists disagreed with my classification of *Parakeelya* (Obbens, 2006; also J. G. West, oral comm., 1999). The reason for this was that the Australian specialists believed that the monotypic genus *Rumicastrum* Ulbr. [Type: *R. chamaecladum* (Diels) Ulb.] *possibly* pertained to the Australian *Calandrinia* s. l. clade. This relationship was asserted by Carolin (1987, 1993; see also Western Australian Herbarium Database (1998–);[2] Seddon, 2005; Short, 2005). In this case, the older name *Rumicastrum* would have nomenclatural priority over *Parakeelya* (Art. 11; Turland et al., 2018). On advice from another botanist that *Rumicastrum* pertained to Chenopodiaceae, in which it had been classified, Hershkovitz & Zimmer (1997) rejected Carolin’s (1987) conclusion, and this is why Hershkovitz (1999 [“1998”]) created *Parakeelya*. In hindsight, my rejection of Carolin’s (1987) conclusion was unjustified. I ought to have published at that time recombinations for the Australian species in *Rumicastrum*. But at that time I did not have access to specimens and literature that would have allowed me to resolve this question.

Hancock et al. (2018) established definitively that *R. chamaecladum* indeed pertains to the Australian clade, which also established that my classification of *Parakeelya* was erroneous (as I myself suggested in Hershkovitz, 2006; cf. Obbens, 2006). At the same time, they demonstrated that retention of these species in *Calandrinia* was untenable, because the clades were not sister groups, hence such circumscription of *Calandrinia* is not monophyletic.[3]

Based on Hancock et al.’s (2018) evidence, Hershkovitz (2019) *correctly* accepted *Rumicastrum* as the name for the Australian *Calandrinia* s. l. clade, since neither *Parakeelya*, nor *Calandrinia* would have been tenable at this point. Also, Hershkovitz (2020a; see also Hershkovitz, 2021b) published a catalog of taxonomic recombinations in *Rumicastrum* for the Australian species named in *Calandrinia*, many also with synonyms in *Parakeelya*. This classification later was accepted in the world’s premier and most scientifically rigorous global taxonomic database (Govaerts et al., 2021) and consequently most reliable and informative online plant taxonomic reference (POWO, 2023) and global biodiversity database (GBIF Secretariat, 2017).

[1] Hershkovitz (2021a) called this the “Candollean” concept of *Calandrinia* and described its operational history.

[2] Cited in Hershkovitz (2019) as “Nicholson (1998)” and accessed at that time. Currently the remark reads the same: the Australian *Calandrinia* s. l. species “…are likely to in the future to be recognized as the genus *Rumicastrum*.” (accessed 30 Aug 2023).

[3] Nothing in the nomenclatural code (Turland et al., 2018) dictates that taxonomy must follow phylogeny, but this practice has become conventional (e.g., Govaerts et al., 2021).

Nonetheless, Hancock et al. (2018)[4] continued to apply the name *Calandrinia* to both *Calandrinia* s. str. and the Australian clades together, even as this work rejected monophyly of this circumscription. In fact, this two-clade circumscription was novel and seems to have been contrived by Hancock et al. (2018) for the purpose of rejecting it (Hershkovitz, 2019, 2020a).[5] The title of Hancock et al.'s (2018) work, "Phylogeny, evolution, and biogeographic history of *Calandrinia*," thus is peculiar, because the authors did not discuss *Calandrinia*. They discussed the clade that they effectively segregated from *Calandrinia*, whose nomenclaturally correct name was *Rumicastrum*. Somehow, the reviewers and editor of this work missed this contradiction. In fact, earlier, Hancock (2017) used the name *Rumicastrum* when presenting this work publicly in January, 2017. Equally puzzling, thereafter, some of the same authors described a total of seven new species in what they *knew* to be the "wrong" genus (Obbens, 2018, 2019; Albrecht & West, 2022; West & Albrecht, 2023).

Perhaps most puzzling, the same authors formally proposed that the generic name *Parakeelya* be conserved over the older name *Rumicastrum* (Thiele et al., 2018). It was puzzling because the authors previously had rejected this classification for nearly two decades (e.g., Obbens, 2006). More importantly, taxonomic conservation proposals of this sort generally involve a name that has had a long history of application, such that its replacement with a technically older but obscure name would disrupt established taxonomic usage, while not offering any particular taxonomic advantage. In fact, among the earliest of formally conserved generic names is *Calandrinia* itself. This was upon early 20th Century realization that the Type of an older but obscure name, *Baitaria* Ruiz. & Pav., pertained to this genus. Since *Calandrinia* had, by then, become widely applied in all of the taxonomic and floristic literature published throughout the world, its name was conserved.[6]

But the case exemplified by *Baitaria* was not applicable to *Parakeelya*. While Thiele et al. (2018) cited several publications that applied the name *Parakeelya*, the overwhelmingly most commonly applied generic name was…still *Calandrinia*. For example, until 2022, all of the major online global taxonomic/biodiversity databases[7] accepted *Calandrinia* and for the Australian species. They rejected *Parakeelya* and listed published combinations therein as taxonomic synonyms of the respective *Calandrinia* species. POWO and GBIF switched to *Rumicastrum* mid-2022. Post-1998 ecological and floristic works and databases published in Australia, too numerous to list, used *Calandrinia* and rarely mentioned *Parakeelya* or *Rumicastrum*. Moreover, conservation of *Parakeelya* also would require that this name be applied to *Rumicastrum chamaecladum*. Yet the generic classification of the latter was not controversial. Changing its generic name to one largely unknown and little used seemed utterly contrary to the provisions of the nomenclatural code.

The Thiele et al. (2018) proposal received only seven of the necessary 11 votes to be recommended for conservation of *Parakeelya* by the Floral Nomenclature Committee (NC; 17 members voting) of the International Association of Plant Taxonomists (IAPT; iapt.org). This committee neither accepted nor rejected the proposal (Applequist, 2023), punting the decision to the larger General Committee (GC; 25 members). I understand that this committee has accepted the proposal, so *Parakeelya* will become the conserved and permanent name for the clade that includes *Rumicastrum*.[8] For this reason, I recombine here in *Parakeelya* outstanding names in *Calandrinia* and *Rumicastrum* lacking such combination, and I name a new species in this genus. But in order to better understand the reasons for the change from *Rumicastrum* to *Parakeelya*, I elaborate a bit more on this history of these taxa below.

**Taxonomic history of the Australian clade of *Calandrinia* s. l.**

Carolin (1987) published a phylogenetic analysis of classical Portulacaceae (e.g., McNeill, 1974; cf. Nyffeler & Eggli, 2010), in which he found that the prevailing Candollean circumscription of *Calandrinia* (*Calandrinia* s. l.; see Hershkovitz, 2021a), was polyphyletic. He recommended splitting this genus into several genera that reflected their phylogenetic history. Carolin (1987, 1993) referred the Australian species to the thence monotypic genus *Rumicastrum* (see above). Carolin (1987, 1993) clearly was convinced of the accuracy of his opinion. My 1993 phylogenetic analysis of Portulacineae (Hershkovitz, 1993a) confirmed Carolin´s (1987) main result regarding the polyphyly of *Calandrinia* s. lato.

As to the relation of the Australian *Calandrinia* s. l. clade to *Calandrinia* s. str. (sensu Hershkovitz, 1993a), Carolin found the latter to be polyphyletic, with the Australian clade *sister* to the *annual* species (*C.* sect. *Calandrinia*; Hershkovitz, 2019), but not closely related to the perennial species (*C.* sect. *Caespitosa*; Hershkovitz, 2019), which Carolin (1987, 1993) referred to *Baitaria* Ruiz & Pav. Hershkovitz (1993a) demonstrated that Carolin's (1987) data matrix included numerous typographical errors, and

[4] Received for publication 16 January, 2018; accepted 9 April, 2018; published 11 July, 2018; https://bsapubs.onlinelibrary.wiley.com/doi/full/10.1002/ajb2.1110 (accessed August, 2023).

[5] Operationally, this circumscription existed, but only as an artifact of the Australian specialists' belligerent misapplication of the name *Calandrinia* to the Australian species. This two-clade circumscription was not accepted in *any* classification of Portulacaceae or Montiaceae. It conformed *neither* to the prevalent "Candollean" circumscription (based on sepal persistence; Hershkovitz, 2021a), *nor* to any cladistic classification, based on phylogenetic analysis.

[6] The history of this conservation can be found in the Shenzhen Code Appendices (Turland et al., 2018) database at the following website by entering the taxon name and selecting the proposals/requests option: https://naturalhistory2.si.edu/botany/codes-proposals/index.cfm

[7] Including GBIF (GBIF Secretariat, 2017), Plants of the World Online (POWO, 2023), Tropicos (without year), and World Flora Online (WFO, 2023).

[8] J. McNeill, written comm., 28 August 2023.

that these, besides interpretative errors, were responsible for both the polyphyly of *Calandrinia* s. str. and the relation of the Australian clade only to the annual species, as reported by Carolin (1987). In Hershkovitz (1993), the Australian clade was not sister to *Calandrinia* s. str. In fact, its affinity to currently accepted Montiaceae could not be established. Subsequent molecular analyses confirmed Hershkovitz (1993a) circumscription of *Calandrinia* s. str. and showed the Australian clade having unresolved relations within Montiaceae.

Carolin prepared a complete catalog of taxonomic transfers of the Australian species to *Rumicastrum*, which he sent me in 1987. But he retired in 1986, and did not publish it. He invited me to publish it with his co-authorship. I declined, mainly because I focused on the American taxa of classical Portulacaceae, and on generic- and higher-level systematics. I did not feel sufficiently knowledgeable of the species of *Rumicastrum* to treat them taxonomically. And I presumed that certainly *somebody*, presumably in Australia, would publish the combinations in timely manner (see, e.g., Western Australian Herbarium (1998–). I was wrong.

In 1997, I published a paper on molecular evidence for the origins of Cactaceae (Hershkovitz & Zimmer, 1997). This analysis included a single sample of an Australian species classified only in *Calandrinia*. I attempted to recombine the name of *this* species in *Rumicastrum*, but the editor, Werner Greuter, would not allow it. The original Type specimen of *Rumicastrum* was destroyed in the fire in the Berlin herbarium (B) in 1943. But Greuter examined a more recent equivalent collection in B, and he insisted that it was not Portulacaceae, but rather Chenopodiaceae, the family in which it was described. Having no access to this or any other material of this species, and not wanting to delay publication of my paper, I deferred to Greuter and used the *Calandrinia* name. Only recently did I appreciate that the B specimen was a duplicate of one of six collections of this species made in 1982–1984 and stored in Australian herbaria.[9] So now it is clear to me that Carolin's diagnosis (see above) probably was based on many more specimens. And Greuter, unlike Carolin, was not particularly experienced with Portulacaceae and Australian *Calandrinia* s. l., in particular. In hindsight, I should have given more weight to Carolin's opinion and published my paper elsewhere using *Rumicastrum*.

But this did not solve the problem for me. I was analyzing data for another work that included the same Australian sample but also much greater sampling for *Calandrinia* and other Montiaceae (Hershkovitz & Zimmer, 2000). The phylogenetic relations of the Australian sample did not resolve, but the sequence was highly divergent from that of all other genera. It seemed untenable to me to continue to classify the Australian species in *Calandrinia*. But still not having access to specimens of *R. chamaecladum* or even most Australian species of *Calandrinia* s. l.,[10] I created *Parakeelya* and the associated combinations (Hershkovitz (1999 ["1998"]). I was not certain that *Rumicastrum* did not belong here, but my objective was to separate the Australian plants taxonomically from *Calandrinia* s. stricto. On *this* point, my decision was prudent.

In 1999, I attended the International Botanical Congress in St. Louis, Missouri. There, I met Judy West (an author of Hancock et al., 2018 and Thiele et al., 2018). She advised me that my classification of *Parakeelya* was incorrect, which I took to mean that she believed that *Rumicastrum* indeed belonged in this clade. Obbens (2006: 96) sheds light on this: "*Rumicastrum*…clearly is a member of the Portulacaceae…but its affinities within the family are uncertain. *Parakeelya* has not been generally accepted in Australia due to…[uncertainty as to] whether or not *Rumicastrum* is congeneric with the other Australian species of *Calandrinia*." So possibly my error was not so much in my classification of *Parakeelya* as it was in my referring *Rumicastrum* to Chenopodiaceae.

Similarly, Thiele et al. (2018: 215) later remarked that "…*Parakeelya* was not adopted…because Australian botanists continued to correctly ascribe *Rumicastrum* to Portulacaceae with a *likely affinity* [italics mine] to *Calandrinia*." There is sort of a shell game going on here. By "*Calandrinia*," these workers meant the species that the Australian spcialists continued to classify in *Calandrinia* despite lack of evidence that they *pertained* to *Calandrinia* s. stricto. Put another way, the Australian specialists had no problem with classifying the Australian species in *Calandrinia* despite considerable morphological and molecular evidence that they did *not* pertain to this genus. But at the same time, they were not ready to accept Carolin's (1987) conclusion that *Rumicastrum* pertained to this clade…for reasons that they never articulated (see below).

I left academics after 2006, and I did not return to the question of Montiaceae systematics until 2018. Examining the more recent literature, I found that multiple molecular analyses using more and different Australian species found essentially the same result that I did in Hershkovitz & Zimmer (2000) and Hershkovitz (2006), viz., the sequences were divergent from those of all other genera, but their phylogenetic position remain unresolved. Especially significant were the results of Ogburn & Edwards (2015). Although they reported conflicting results depending upon data sets used, their operational (preferred?) tree (Ogburn & Edwards, 2015; Fig. 4) includes seven taxa in a monophyletic Australian clade that is sister to a clade comprising North American

[9] https://biocache.ala.org.au/occurrences/search?&q=taxa%3A%22Rumicastrum%22&disableAllQualityFilters=true&qc=data_hub_uid%3Adh9

[10] Technology and the "information highway" in 1997 were rudimentary by today's standards. Today, I do taxonomic research on my cheap cell phone on the street at night outside McDonald's, while I wait for them to throw out their trash, hopefully with a few uneaten hamburgers.

Montiaceae, i.e., not sister to *Calandrinia* s. stricto. At least this analysis included many more samples and loci than in previous analyses. Interestingly, this is the *same* topology preferred in Hancock et al.'s (2018) phylogenomic analysis.[11]

As noted, the first genetic sampling of *R. chamaecladum* was reported by Hancock et al. (2018), and this analysis confirmed its placement *within* the Australian clade. This rendered *Parakeelya* paraphyletic. The *R. chamaecladum* sample analyzed actually was collected in 2011.[12] However, the question of whether or not *R. chamaecladum* pertained to the Australian clade hardly required the complex and data-intensive genomic analysis undertaken by Hancock et al. (2018). This seemed to me like using a steam roller to squash a cricket. The relations of *R. chamaecladum* could have been established within a few hours using a standard assay for rDNA-ITS sequence. That finding could have been published years earlier. That is, *if* the authors were truly interested in dispelling the doubts raised by one of them more than a decade earlier (Obbens, 2006; see above), hence the proper circumscription and taxonomy of the Australian clade.

Several observations might lead one to believe that Thiele et al. (2018) had some reason besides taxonomic stability for proposing conservation of *Parakeelya* over *Rumicastrum*.

**1.** Notwithstanding the manifest *taxonomic* importance of *Rumicastrum* relations to Montiaceae taxonomy, the Australian specialists had been very slow to diffuse relevant information of any sort on *R. chamaecladum*. Practically no information was available besides sketchy historical descriptions and that reported by Carolin (1987). I have found no images of plants, alive or dead, published or referred to anywhere on the internet. The botanical world outside of Australia knew *only* that *R. chamaecladum* has single-seeded indehiscent fruits, that three different German botanists (in 1910, 1934, and 1997) classified it in Chenopodiaceae, and that one Australian botanist classified it as the Type of the Australian clade of *Calandrina* s. l. (Carolin, 1987, 1993). Other Australian botanists rarely mentioned *Rumicastrum* and added essentially no additional information. Obbens (2006) articulated no *reason* to doubt and, therefore, taxonomically reject Carolin's conclusion.

Obbens (2019) may provide some insight as to why. Here, he described two new species (as *Calandrinia*) with indehiscent fruits (like *R. chamaecladum*), and he mentioned that two other described species also had such fruits.[13] Citing Hancock et al. (2018), he discussed how one of the single-seed species, described as *C. monosperma* Syeda ex Obbens, was closely related and otherwise similar to *R. chamaecladum*. But he did not explain why, therefore, he deliberately *misclassified* this species in *Calandrinia* (cf. Hancock et al., 2018, which Obbens coauthored; cf. Hershkovitz, 2020a, b; 2021b). As in the case of Hancock et al., 2018), evidently the editors and reviewers overlooked this contradiction. Also, Obbens (2019) provided no hint as to why Obbens (2006) considered as unresolved the relation of *R. chamaecladum* to the Australian clade. The only distinction he discussed was the indehiscent fruit. But this also characterized *other* Australian clade species.

In my earlier reading of this work, I overlooked the comment that the *C. monosperma* was first described in an unpublished thesis in 1979…*forty years earlier*![14] Obbens (2019) cited a total of 29 collections, the oldest from 1973, including six collections of his own, the oldest from 2004.[15] This demonstrates that Obbens and likely another Thiele et al. (2018) author, J. G. West, were aware

[11] Hancock had been working in the same lab since 2012 (https://www.linkedin.com/in/lillian-hancock-6b096938; accessed 30 Aug 2023), so presumably her genomic analysis was well-underway at the time Ogburn & Edwards (2015) was finalized.

[12] https://www.ncbi.nlm.nih.gov/biosample/7987794; https://biocache.ala.org.au/occurrences/d9101d00-e962-4cf9-8113-19a024fb42bb; the species was collected also in 2003 (see URL in earlier footnote), but evidently it is not found often, reportedly because it is a post-fire species. Most of the collections concentrate from a small zone ca. 5 hours by car from Perth, Western Australia. Another locality is somewhat further away.

[13] Carolin (1993) reported that only one species of "*Calandrinia* (*Rumicastrum*)" had indehiscent fruits, viz. *R. chamaecladum*. But this work was prepared no later than 1986. Carolin's (1987) cladistic analysis and discussion did not mention indehiscent fruits even in this species, and he scored his three Australian *Calandrinia* s. l. taxa OTUs as having dehiscent fruits. In fact, Carolin (1987) did not per se analyze the relations of *R. chamaecladum*, and neither here, nor in Carolin (1993), did he otherwise characterize this species (except as having indehiscent fruits) or explain why he referred *Rumicastrum* to the Australian clade. Hershkovitz (1993a) failed to note this omission but accepted Carolin's (1987, 1993) conclusion. Hence, the doubt expressed by Obbens (2006) seems reasonable, except that he had collected in 2004 and several times thereafter plants of the single-seeded indehiscent *Rumicastrum*-like species that was described in 1979 as a *Calandrinia*, and he interpreted additional species as having indehiscent rather than dehiscent fruits.

[14] Technically, I cited illustrations from this thesis in Hershkovitz (2002). However, all references to illustrations in this work, most of which I had not seen, were added to the manuscript by the editor, Urs Eggli. He is a "ghost" coauthor. I had accepted Eggli's invitation to contribute a treatment of *Lewisia* Pursh to this volume, but I initially declined to contribute *Parakeelya*, citing my utter lack of familiarity with the species taxonomy. I suggested that he recruit an Australian researcher, e.g., J. G. West. But Eggli was persistent. I capitulated, because I owed him a favor, after he had graciously and generously provided me with plant samples for Hershkovitz & Zimmer (1997). Hershkovitz (2002) is based entirely on older and somewhat sketchy references. West, in any case, certainly would not have agreed to contribute a treatment of these species using any generic name other than *Calandrinia*.

[15] Obbens (2019) reported that the other indehiscent species described in this work was first collected in 1965, and Obbens collected it twice in 2003. Again, Obbens' familiarity with these plants – live plants – begs the question of why he questioned the unxplained *generic* distinction of *R. chamaecladum* in Obbens (2006).

for more than three decades that *R. chamaecladum* was *not* exceptionally distinct from other western Australian taxa that were described as *Calandrinia*. One also can surmise from Obbens (2019) that if *R. chamaecladum* had been discovered and described in, say, 1990, it *also* would have been described as *Calandrinia*, and not in a distinct genus, much less family. The 1979 thesis, incidentally, was written by a student of Carolin. This possibly explains Carolin's accurate but unexplained conviction (in 1986) that *Rumicastrum* pertained to the Australian *Calandrinia* s. l. clade. But upon his retirement, the matter was left to other Australian specialists.

Thus, Obbens must have been familiar with *C. monosperma* and other "*Rumicastrum*-like" species classified in *Calandrinia*, when, in Obbens (2006), he still questioned the proposed inclusion of *Rumicastrum* in Australian *Calandrinia* s. lato. This morphological evidence remained under wraps until *after* Thiele et al. (2018) proposed conservation of *Parakeelya*.

**2.** Another justification for retaining the Australian species in *Calandrinia* was that the Australian specialists also supposed that the Australian *Calandrinia* s. l. clade *might* be sister to *Calandrinia* s. stricto (Hancock et al., 2018). This would render taxonomically acceptable the two-clade circumscription (cf. Govaerts et al., 2021). But this is a red herring. Monophyly might be necessary to justify taxonomic merging of these taxa, but it is not sufficient. After all, the Tree of Life is presumed to be monophyletic, but this does not justify its classification as a single genus. Current generic and higher level classification is *conditioned* on phylogenetic relations, but it is based mainly on auxiliary information. In this case, even before Hancock et al. (2018), morphological, molecular, and biogeographical evidence indicated that *Calandrinia* s. str. and the Australian clade were phylogenetically highly divergent lineages of Montiaceae. Even if Hancock et al. (2018) had demonstrated that they were remotely sister taxa, this would not justify their generic merging, because this would conceal *taxonomically* the evidence for their divergence and independent histories. Technically, it is possible that the extensive sampling of Hancock et al. (2018) could have demonstrated that the Australian species were paraphyletic with respect to *Calandrinia* s. str., but the morphological, molecular, and biogeographic evidence rendered this possibility sufficiently remote as to be preemptively discarded.

I interject here that the taxonomic minutia described in this work precisely explains why the rest of the biological community finds taxonomic science to be so bewildering and exasperating as to be considered "useless." But taxonomic dynamics ("name changes") are driven by three very simple parameters; style, substance, and rules. Substance is biological data that comprises taxonomic evidence. Obviously this increases over time, hence effect name changes, but in a determinate manner. Style refers to taxonomic criteria, e.g., phylogenetic, phenetic, lumping versus splitting, etc. This effects name changes, but in an indeterminate manner. Rules are nomenclatural rules. Ideally, these are constant, but rules do change and exceptions are allowed. Rules per se effect name changes, but minimally, lest they not be rules.

Recent disagreements on the taxonomy of the Australian *Calandrinia* s. l. reflected primarily substance (supposedly), and to a lesser extent style. Following Carolin (1987) and Hershkovitz (1993), the Australian specialists continued to classify the Australian species in *Calandrinia* because they argued that *R. chamaecladum* might not pertain to Australian clade (substance), and that the Australian clade might be sister to *Calandrinia* s. str. (substance), hence that classification of the former in the latter technically was acceptable under cladistic classification (style). Given this substance and style, they still adhered to the rules (the nomenclatural code).

But these arguments were dispelled by Hancock et al. (2018). The solution proposed by Thiele et al. (2018) reflected neither style, nor substance. It involved only rules. They sought an exception, which the rules occasionally allow. Nonetheless, in the meantime, given the substance together with the style *professed* by Thiele et al. (2018), the authors' many subsequent formal applications of the name *Calandrinia* to describe and/or refer to the Australian species was in *violation* of the rules to which they professed to adhere. The existence of the unapproved proposal was irrelevant. Pending evaluation of the proposal, the reported substance (Hancock et al., 2018) and style manifested by these authors (cladistic classification criterion) *dictated* that they use the name *Rumicastrum* formally. Classifying new species in *Calandrinia* did not per se violate the rules. It only violated the rules to the degree that the authors professed adhesion to cladistic classification. By this criterion, the classification of new species in *Calandrinia* was not only wrong, it was disinformation.

I add to the above a thought experiment. Supposing that, in a parallel world, it turned out that the Type of name *Calandrinia* was an *Australian* species, and that consequently, a parallel world Carolin segregated the American species into a separate genus, whose earliest validly published name was *Rumicastrum*. On the basis of the *same* evidence published prior to 2018, would the parallel world Australian specialists have continued to include the now *American* genus *Rumicastrum* in the *Australian* genus *Calandrinia*? I doubt it.

**3.** Thiele et al. (2018) evidently was submitted *before* submission of Hancock et al. (2018).[16] But it was submitted long after January, 2017, when Hancock (2017) presented the research orally…using the name *Rumicastrum*…which was changed back to *Calandrinia* for purposes of publication…with Obbens and West as coauthors. Thus, presumably the authors had genetic evidence for the relations of *Rumicastrum* at some point in 2016, if not earlier. As I noted above, genetic evidence could have been obtained easily five years earlier from the same specimen, and even years earlier than that if the Australian specialists

[16] Hancock et al. (2018) was submitted 16 January 2018, just two weeks before *publication* of Thiele et al. (2018) on 1 February 2018.

believed that the genetic relations of *Rumicastrum* warranted prioritized investigation. But adequate morphological evidence was available by the mid-1980s (see above).

This raises two questions. First, why did they wait so long to propose conservation of *Parakeelya*, which they had so long rejected? The answer to this question is simple. The proposal would have been untenable had the name *Parakeelya* not acquired sufficient traction in the literature. In other words, conservation required that a sufficient number of *other* investigators used a name that they themselves had rejected. The longer the problem remained "unresolved," the larger the number of publications that would use *Parakeelya*.

More troubling, why did they propose conservation of *Parakeelya* at all? They were aware certainly by 2016 that the genetic evidence demonstrated definitively that *Rumicastrum* pertained to the Australian clade. Recombining the species names in *Rumicastrum* would have solved this malignant ambiguity (by Obbens' 2006 account) punctually and definitively. This is the objective of taxonomic research, one just as or more important than describing new species. The authors could not have been unaware that a conservation proposal – in the name of *reducing* taxonomic confusion – would substantially *postpone* this resolution – and *increase* taxonomic confusion. Which it did…*for five-and-a-half years*…in no small measure because the authors continued to use and described new species in *Calandrinia*. This confusion, which could have been avoided by accepting Carolin's proposal back in 1987, likely will persist for decades.

**4.** The data published by Thiele et al. (2018) in support of their proposal are *grossly* erroneous. They reported that the genus comprised 47 "accepted" species, *R. chamaecladum* plus 46 species named in *Calandrinia*, 35 of which had valid names also in *Parakeelya*. This means that there were *eleven* in *Calandrinia* but not *Parakeelya*. These figures make is seem like *three-quarters* of the "accepted" species already had names in *Parakeelya*, and this would argue in favor of conservation per Art. 14 (Turland et al., 2018). They also reported here that retention of *Rumicastrum* would "*add* 82 synonyms [italics mine]" to the taxonomy, also seemingly a large number.

But further inspection reveals that these numbers are *false* and *severely* distorted in favor of conservation of *Parakeelya*. Using the 47-species figure, only 46, *not* 82, synonyms would have been *added*. They counted the "35" twice, which makes 82. But more problematic, the succeeding sentences indicate that the number of species classified in *Calandrinia* and not *Parakeelya* was 16, not eleven. Adding this to 35 plus *R. chamaecladum* yields *52* species, not 47. And in this case, the number of species with names in *Parakeelya* shrank from three-quarters to two-thirds.

However, the figure of 35 species named in *Parakeelya* also is misleading. According to the Australian Plant Census (APC, without year), one so named is considered a synonym of another, and one is annotated as being of "uncertain application." This usually means that no type specimen is known, and the original protolog is diagnostically inadequate. In any case, only 33 of the names in Parakeelya would have required recombination in *Rumicastrum*. Thiele et al. (2018) authors ought to have known this, because they probably are the corresponding authorities for this taxon in APC.

But the 16-species number also is short. The Thiele et al. (2018) proposal stemmed from the results of Hancock et al., (2018), which included all of the Thiele et al. (2018) authors except Thiele. Hancock et al. (2018) reported that their analysis included "64 of the ~74 *recognized* species [italics mine]" of Australian *Calandrinia* s. lato. This number excludes two of the 35 with names in *Parakeelya* (see above), so only about half had of the "recognized" species had names in this genus. Obviously these numbers are *much* higher than the same authors reported in Thiele et al. (2018). The difference is explained partially because a large number of "recognized" species were not yet validly named per the nomenclatural code (Turland et al., 2018). Still, "recognized" and "accepted" are vernacularly nearly synonymous, hence Thiele et al. (2018) *should have* reported (but also explained) this figure.

In any case, by the time Thiele (2018) was published and Hancock et al. (2018) submitted, there were *17* (not 16 or 11) Australian species validly named in *Calandrinia* but not *Parakeelya*. But this figure also is misleading. Thiele et al. (2018) also did not report imminent publications (by one author) that would *add* four names in *Calandrinia* (Obbens, 2018 [submitted 18 April 2017]) and Obbens & Barrett (2018 [submitted 4 September 2017]). Thus, the authors *must* have been aware and *should have* reported that the genus included ~74 species, 57 actually or *imminently* validly named, with 21 (not 16) being the number named in *Calandrinia* but not *Parakeelya*. Thirty-three, not 35, would have required recombinations had *Rumicastrum* been retained. Thus, the total numbers of reported necessary recombinations should have been 54 in the case of retention of *Rumicastrum* and 22 in the case of conservation of *Parakeelya*. This still favors *Parakeelya*, but the ratio is much less than that implied in Thiele et al. (2018). By the time the IAPT NC and (later) GC met in 2023, there were four additional Australian species described in *Calandrinia*, so the numbers were 61 versus 26, the differential shrinking even further.

**5.** But the Art. 14 argument should have been *disqualified* by the NC and GC, because Hershkovitz (2020a) published a catalog of combinations in *Rumicastrum* for all but four of the *Calandrinia* names. Moreover, by mid-2022, these combinations were accepted by Govaerts et al. (2021) and the POWO and GBIF databases. All other databases continued to apply *Calandrinia*, listing the *Parakeelya* combinations as synonyms. Again, *Parakeelya* and its combinations never were accepted by any taxonomic database.

**6.** By the time of the NC and GC meetings, the only remaining *valid* argument for conservation *Parakeelya* pertained to the prevalence of its use in taxonomic and other scientific literature and databases.[17] Here, *again*, the data presented by Thiele et al. (2018) are *false* and/or distorted in favor of *Parakeelya*. The authors gave nine examples of research publications that used *Parakeelya* "either alone or parenthetically in combination with *Calandrinia*." These mostly used the name, at best, incidentally and/or referred to a single species. The only "exceptions to the rule" are papers by two groups, including themselves and a group with which they closely collaborate, that used *Parakeelya* in earlier papers…but *Calandrinia* in more recent papers.

But Thiele et al. (2018) also reported that *Rumicastrum* had been used "only rarely *and* [italics mine] informally to refer to the Australian *Calandrinia* [s. l.] clade." They cited no publications. The assertion is *patently* false. Besides Carolin (1987), *six* references used *Rumicastrum* and *not Parakeelya*: Carolin (1993) and Hershkovitz (1991a, b, 1992, 1993a, b). Hershkovitz (1993a) was cited by Hancock et al. (2018), hence *authors* of Thiele et al. (2018), and it was cited in four previous publications of E. J. Edwards dating back to 2005, who also twice cited Carolin (1993).

*Rumicastrum* also was mentioned in at least *five* publications (in addition to *Parakeelya*) as possibly the correct name for the Australian *Calandrinia* s. l. clade: Hershkovitz (2006), Obbens (2006), Winter & Holtum (2011), Hernández-Ledesma et al. (2015), and Holtum et al. (2017). The last includes two Thiele et al. (2018) authors. Also, in a popular book published in Australia, Seddon (2005) described the discovery that led to Carolin's (1987) identification of *R. chamaecladum* as an Australian species of *Calandrinia* s. lato. This book was reviewed by Short (2005) in the Australian Systematic Botany Society Newsletter, presumably widely read by Australian plant taxonomists, but most likely not read outside of Australia. Quoting Seddon (2005), Short (2005) wrote, "…'that *Rumicastrum* is the correct name for the Australian *Calandrinia*, although the formal process of the name change is not completed'…whether the final circumscription of *Rumicastrum* is in fact finalized…I don´t know."

Thus, while it is clear that more publications have used *Parakeelya* than *Rumicastrum*, the latter name hardly was unknown or unused. Moreover, consideration of the *quality* of literature usage, the difference in publication numbers becomes unimportant. The critical references that considered the morphology and generic relations of these species are Carolin (1987, 1993) and Hershkovitz (1991a, b, 1992, 1993a, 1993b), and these used *Rumicastrum*. Within Australia, there were two *taxonomic* references to *Rumicastrum* as the correct name, with no mention of *Parakeelya* (Western Australian Herbarium, 1998–; Short, 2005).

It is important also to consider *why* other publications used *Parakeelya*. Partially this was because there were combinations in *Parakeelya* and not in *Rumicastrum* for the species of interest. Thiele et al. (2018) authors historically were more than a little bit responsible for this, viz. they continued to use *Calandrinia* and not *Rumicastrum*, and *never* articulated an *evidence-based* explanation as to why. But the other main reason for the historical use of *Parakeelya* has been incidental to the recognition that Australian *Calandrinia* s. l. comprise a lineage that is morphologically, genetically, and geographically, hence *phylogenetically*, highly diverged from *Calandrinia* s. stricto. The Australian species *needed* a name *different* from *Calandrinia*. Thiele et al. (2018) authors[18] refused to acknowledge this until Thiele et al. (2018). Nonetheless, thereafter, they continued to apply *Calandrinia*.

**7.** Thiele et al. (2018) failed to mention that, regardless of the difference in their usage, historically (and currently), *neither Parakeelya*, nor *Rumicastrum* was used frequently to refer to Australian *Calandrinia* s. lato. By far, since Carolin (1987), the most commonly used name has remained *Calandrinia*, which Thiele et al. (2018) authors continued to use up to the present year.

**8.** Thiele et al. (2018) failed to emphasize that, while *Rumicastrum* has been used to refer to Australian *Calandrinia* s. l., neither *Parakeelya*, nor *Calandrinia*, *ever* have been used to refer to *Rumicastrum*. A case for deprioritization of a historically and currently stably applied name must be much stronger than for that for the contrary case, such as *Baitaria*. The charter and essential principle of the nomenclatural code is to conserve priority. While the code includes standards and protocols for superseding priority, these protocols are *not* the code's function. If it were, then the code itself would be useless.

**9.** Conservation proposals generally are scholarly analyses of historical taxonomic minutia in painstaking detail. They usually have few authors, and these are usually established taxonomic specialists on the taxa discussed. The median number of authors of 104 conservations proposals listed in Applequist (2023) is two. Thiele et al. (2018) has five authors. This might seem to give a sense of broad taxonomic consensus, which itself might lend credence to the proposal. But only three authors are *taxonomic* specialists, and only two are specialists on Australian *Calandrinia* s. l. species. *None* have published classificatory papers on Montiaceae as a whole. And this is the context to which conservation of a generic pertains.

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[17] Thiele et al. (2018) emphasized at length that "parakeelya" is an Australian indigenous name for one of the Australian species and has become more widely used as a vernacular generic name for several species. This is why Hershkovitz (1999 ["1998"]) chose this name in the first place. But vernacular names (just like invalidly published scientific names) have no currency at all for purposes of nomenclatural code protocols (Art. 36; Turland et al., 2018). While the proposal might include such incidental information (i.e., the etymology of the scientific name), it has no place in a conservation argument, any more than would an invalid scientific name. This argument should have been *editorially* deleted from the Thiele et al. (2018) prior to its publication. But this information also was included – *inappropriately* – in the NC report (Applequist, 2023), which was forwarded for consideration by the GC.

[18] Except Hancock, who used the name *Rumicastrum* in an oral presentation (Hancock, 2017) of Hancock et al. (2018).

**10.** In my first meeting with J. G. West in Davis, California in 1989 or 1990, she manifested her distaste for the admittedly "ugly" name *Rumicastrum* and her preference for the name *Calandrinia* for the Australian species. I do not recall, however, that she expressed any doubt as to the relation of the former to the latter.

**Conclusions**

The Australian specialists long rejected use of the generic name *Parakeelya* for the Australian clade of *Calandrinia* s. lato. This was mainly because of the possibility that *Parakeelya* was paraphyletic with respect to the earlier-named *Rumicastrum* (Obbens, 2006) and also because of the possibility that the Australian clade was sister to *Calandrinia* s. stricto (Hancock et al., 2018). Yet, *because* Hancock et al. (2018) established that indeed *Parakeelya* was paraphyletic and the Australian clade was not sister to *Calandrinia* s. str., the same authors proposed to conserve the name that they rejected for these very doubts. This is bizarre, and it begs explanation.

There are two possible explanations:

**A.** One explanation emphasizes the observation of what is revealed in Obbens (2019), viz. the apparently long-held knowledge that some Australian *Calandrinia* s. l. species were *Rumicastrum*-like. This implies that there was no *tangible* reason to doubt that *Rumicastrum* pertained this clade, contrary to what is stated…but not *explained*…in Obbens (2006). And the explanation emphasizes the observation that the information in Thiele et al. (2018) is egregiously erroneous in ways that favor the proposal and contradicts information presented by the same authors in Hancock et al. (2018) and in other sources. This leads to the possibility that, for decades following Carolin (1987), the authors actually *believed* that *Rumicastrum* pertained to the Australian *Calandrinia* s. l. clade. But they communicated the contrary. They suppressed their knowledge of morphological evidence for the relations of *R. chamaecladum* and its similarity to a *Calandrinia* species described in a 1979 unpublished thesis. They had access to this information; nobody else did. They opted to *not* expedite rapid DNA analysis that would have resolved the question before publication of additional works that applied the name *Parakeelya*. All of this in order to avoid being obliged to accept a correct generic name that they did not like. When Hancock et al. (2018) rendered untenable continued application of the name *Calandrinia*, the authors submitted a nomenclatural proposal that altered/distorted data presented/cited in their *own* publications in a way that would favor formal conservation of a preferred generic name, *Parakeelya*. Other observations described above are consistent with this explanation.

**B.** The other possible explanation is less incriminating but hardly more flattering. Possibly, in the decades following Carolin (1987), the authors were *not* convinced that *R. chamaecladum* pertained to the Australian *Calandrinia* s. l. clade…but they were not *capable* of articulating why. Possibly they were not *capable* of deducing from ample evidence available to them that the conclusion reached by Carolin (1987) and Hershkovitz (1993a) was correct. Possibly they were not capable of appreciating the similarities between a *Calandrinia* described in 1979 and *R. chamaecladum*, and how the similarities between this and other *Calandrinia* species/collections obviated the generic distinction from *R. chamaecladum*. Possibly they did not appreciate that the fundamental problem could be resolved easily and rapidly using the 2003 or 2011 collections…that it did not *require* analysis of the total genome. And perhaps between them, the five authors of Thiele et al. (2018) were not capable even of copying correctly the data reported/cited in their other publications.

I add the above that when I described *Parakeelya* in 1998, I erred, but it was an honest mistake. I myself suggested that it was a mistake in Hershkovitz (2006). I left research for the next 12 years, but my succeeding publications from 2018 onwards reported this error explicitly. But the main purpose of my 1999 publication was to emphasize a conclusion that was not a mistake, viz. that the Australian species of *Calandrinia* s. l. did not pertain to *Calandrinia* s. stricto. In this way, my 1999 publication manifestly represented a significant advance in Montiaceae systematics.

But this advance was substantially undermined by authors of Thiele et al. (2018), who effectively asserted (via taxonomic usage) that the Australian species *did* pertain to *Calandrinia* s. stricto. This was misinformation, and perhaps disinformation. But it also had an impact. Outside of a few specialists, the rest of the world cannot adjudicate the taxonomy of a given genus. They only know that a shared genus name implies a *closer* relationship (in some sense) than an unshared genus name. The name assigned to an organism is *supposed* to represent a scientific assertion about the ontology of that organism. It is *no different* than, e.g., asserting that an organism is a CAM species or a C4 species. But thanks to authors of Thiele et al. (2018), 35 years following Carolin (1987), the Australian species have been known overwhelmingly by the name *Calandrinia*. That is no different from mischaracterizing carbon assimilation mechanism. For example, denominating an Australian species known to assimilate via CAM as, e.g., an "Australian C4 species," as distinct from a "New World C4 species" (cf. Holtum, 2023), in order to avoid referring to the CAM species as CAM species, because the authors do not like the term CAM. Put another way, both cases exemplify reporting wrong or biased information that the authors know is *essentially* untrue. This generally is known as *scientific misconduct*.

The formal processing of the Thiele et al. (2018) proposal by the NC and GC is no less troubling. These committees collectively comprised 37 of the world's top experts on plant taxonomy and the nomenclatural code. The code itself was established more than a century ago precisely to enforce an objective criterion, viz. chronological priority of validly published names, in order to avoid the chaos consequent to personal or local nomenclatural preferences, and in order to deliver to science and society a taxonomy

whose modifications were rooted only in scientific discovery. Exceptions to the rules necessarily were and must remain minimized if the code itself is to survive.

In this case, the system seems to have failed. Clearly the 37 experts, at least one also an authority on Montiaceae and other Portulacineae systematics,[19] did not vet adequately the Thiele (2018) proposal, lest they would have tugged at least one of the loose threads that would have unraveled it. The NC (Applequist, 2023) did not even disqualify an argument for conservation that is out of the purview of the code, one that should have been editorially deleted from the proposal before it was published. Consequently, notwithstanding a less favorable evaluation by the NC, and in a manner perhaps insuperably contrary to the spirit and letter of the code and its institution, the GC eschewed a prioritized name in order to conserve a name:

**i.** that has been used infrequently and is hardly used at all currently;
**ii.** that *never* has been accepted in any major online global taxonomic database;
**iii.** most of whose combinations *never* have been used in publication except in the original publication and a corresponding taxonomic treatment in a popular (nonscientific) reference;
**iv.** that *never* has been used in reference to the type of the older name that it is replacing;
**v.** that replaces the older name used in the most recently published comprehensive taxonomic treatment of its family;
**vi.** that replaces the older name currently used in the most authoritative and rigorous global plant taxonomic reference and the two most important online taxonomic databases;
**vii.** and that now requires publication of ca. 27 new combinations versus four if the older name were retained.

Besides rules, every revision of the nomenclatural code provides examples of how those rules are and have been applied in order to prefer one name over another. I hope that the next edition, to be published in 2024, explains the decision to conserve *Parakeelya*.[20]

**Taxonomic recombinations in *Parakeelya***

Below are new combinations in *Parakeelya* for names previously combined only in *Calandrinia* and/or *Rumicastrum*. Combinations are provided only for those names currently accepted per information in APC, with the exception of three names that I recombined in *Rumicastrum* (Hershkovitz, 2020a), but later (Hershkovitz, 2021b) determined to not pertain to this genus.

***Parakeelya baccata*** (Obbens) Hershk., comb. nov. Basionym: *Calandrinia baccata* Obbens, Nuytsia 24: 37. (1 May) 2014. ≡ *Rumicastrum baccatum* (Obbens) Hershk., Phytologia 102(3): 118. (21 Sept.) 2020.

***Parakeelya butcherensis*** (Obbens) Hershk., comb. nov. Basionym: *Calandrinia butcherensis* Obbens, Nuytsia 24: 208. (21 Aug.) 2014. ≡ *Rumicastrum butcherense* (Obbens) Hershk., Phytologia 102(3): 118. (21 Sept.) 2020.

***Parakeelya chameaclada*** (Diels) Hershk., comb. nov. Basionym: *Atriplex chamaeclada* Diels, Repert. Spec. Nov. Regni Veg. 16: 194. 1919. ≡ *Rumicastrum chamaecladum* (Diels) Ulbr., Nat. Pflanzenfam., ed. 2 [Engler & Prantl] 16c: 519. 1934.

***Parakeelya crispisepala*** (Obbens) Hershk., comb. nov. Basionym: *Calandrinia crispisepala* Obbens, Nuytsia 16(1): 100. (30 Dec.) 2006. ≡ *Rumicastrum crispisepalum* (Obbens) Hershk., Phytologia 102(3): 118. (21 Sept.) 2020.

***Parakeelya flava*** (Obbens) Hershk., comb. nov. Basionym: *Calandrinia flava* Obbens, Nuytsia 21(1): 2. (24 June) 2011. ≡ *Rumicastrum flavum* (Obbens) Hershk., Phytologia 102(3): 119. (21 Sept.) 2020.

***Parakeelya halophila*** (Albr. & J.G.West) Hershk., comb. nov. Basionym: *Calandrinia halophila* Albr. & J.G.West, Austrobaileya 13: 35. 2023.

***Parakeelya holtumii*** (Obbens & L.P.Hancock) Hershk., comb. nov. Basionym: *Calandrinia holtumii* Obbens & L.P.Hancock, Nuytsia 28: 218. (8 June) 2017. ≡ *Rumicastrum holtumii* (Obbens & L.P.Hancock) Hershk., Phytologia 102(3): 119. (21 Sept.) 2020.

***Parakeelya hortiorum*** (Obbens) Hershk., comb. nov. Basionym: *Calandrinia hortiorum* Obbens, Nuytsia 22(6): 352. (18 Dec.) 2012. ≡ *Rumicastrum hortiorum* (Obbens) Hershk., Phytologia 102(3): 119. (21 Sept.) 2020.

***Parakeelya kalanniensis*** (Obbens) Hershk., comb. nov. Basionym: *Calandrinia kalanniensis* Obbens, Nuytsia 16(1): 102. (18 Dec.) 2006. ≡ *Rumicastrum kalanniense* (Obbens) Hershk., Phytologia 102(3): 119. (21 Sept.) 2020.

[19] I refer here to W. Applequist (see Applequist, 2023).
[20] Of course, I could be naïve here. The IAPT, like all human organizations, is fundamentally *political* in nature, notwithstanding any objectives that organizations might project. It is possible that the conservation of *Parakeelya* was a "done deal" at the GC level, and that Thiele et al. (2018) was concocted in the manner that it was just to provide the requisite proposal and to appear to present a reasonable argument.

***Parakeelya lefroyensis*** (Obbens) Hershk., comb. nov. Basionym: *Calandrinia lefroyensis* Obbens, Nuytsia 29: 198. (13 July) 2018. ≡ *Rumicastrum lefroyense* (Obbens) Hershk., Phytologia 102(3): 119. (21 Sept.) 2020.

***Parakeelya mirabilis*** (Chinnock & J.G.West) Hershk., comb. nov. Basionym: *Calandrinia mirabilis* Chinnock & J.G.West, J. Adelaide Bot. Gard. 26(4): 97. 2013. ≡ *Rumicastrum mirabile* (Chinnock & J.G.West) Hershk., Phytologia 102(3): 119. (21 Sept.) 2020.

***Parakeelya monosperma*** (Syeda ex Obbens) Hershk., comb. nov. Basionym: *Calandrinia monosperma* Syeda ex Obbens, Nuytsia 30: 238. (15 Oct.) 2019. ≡ *Rumicastrum monospermum* (Syeda ex Obbens) Hershk., Phytologia 102(3): 120. (21 Sept.) 2020.

***Parakeelya oblonga*** (Syeda & Carolin) Hershk., comb. nov. Basionym: *Calandrinia oblonga* Syeda & Carolin, Proc. Linn. Soc. New South Wales 133: 11. 2012 [2011]. ≡ *Rumicastrum oblongum* (Syeda & Carolin) Hershk., Phytologia 102(3): 120. (21 Sept.) 2020.

***Parakeelya operta*** (Obbens) Hershk., comb. nov. Basionym: *Calandrinia operta* Obbens, Nuytsia 22(6): 359. (18 Dec.) 2012. ≡ *Rumicastrum opertum* (Obbens) Hershk., Phytologia 102(3): 120. (21 Sept.) 2020.

***Parakeelya oraria*** (Obbens) Hershk., comb. nov. Basionym: *Calandrinia oraria* Obbens, Nuytsia 24: 41. (1 May) 2014. ≡ *Rumicastrum orarium* (Obbens) Hershk., Phytologia 102(3): (21 Sept.) 2020.

***Parakeelya pentavalvis*** (Obbens) Hershk., comb. nov. Basionym: *Calandrinia pentavalvis* Obbens, Nuytsia 21(1): 9. (24 June) 2011. ≡ *Rumicastrum pentavalve* (Obbens) Hershk., Phytologia 102(3): 120. (21 Sept.) 2020.

***Parakeelya petrophila*** (J.G.West & Albr.) Hershk., comb nov. Basionym: *Calandrinia petrophila* J.G.West & Albr., Telopea 25: 324. 2022.

***Parakeelya quartzitica*** (Obbens) Hershk., comb. nov. Basionym: *Calandrinia quartzitica* Obbens, Nuytsia 29: 194. (13 July) 2018. ≡ *Rumicastrum quartziticum* (Obbens) Hershk., Phytologia 102(3): 121.v

***Parakeelya rubrisabulosa*** (Obbens) Hershk., comb. nov. Basionym: *Calandrinia rubrisabulosa* Obbens, Nuytsia 24: 210. (21 Aug.) 2014. ≡ *Rumicastrum rubrisabulosum* (Obbens) Hershk., Phytologia 102(3): 121. (21 Sept.) 2020.

***Parakeelya sculpta*** (Obbens & J.G.West) Hershk., comb. nov. Basionym: *Calandrinia sculpta* Obbens & J.G.West, Nuytsia 21(1): 12. (24 June) 2011. ≡ *Rumicastrum sculptum* (Obbens & J.G.West) Hershk. [as R. sculptum (Obbens) Hershk.], Phytologia 102(3): 121. (21 Sept.) 2020

***Parakeelya tepperiana*** (W.Fitzg.) Hershk., comb. nov. Basionym: *Calandrinia tepperiana* W.Fitzg., J. Proc. Roy. Soc. Western Australia 3: 141. 1918 [1916–1917]. ≡ *Rumicastrum tepperianum* (W.Fitzg.) Carolin in Hershk., Phytologia 102(3): 122. (21 Sept.) 2020.

***Parakeelya tholiformis*** (Obbens) Hershk., comb. nov. Basionym: *Calandrinia tholiformis* Obbens, Nuytsia 21(1): 6. (24 June) 2011. ≡ *Rumicastrum tholiforme* (Obbens) Hershk., Phytologia 102(3): 122. (21 Sept.) 2020.

***Parakeelya translucens*** (Obbens) Hershk., comb. nov. Basionym: *Calandrinia translucens* Obbens, Nuytsia 16(1): 104. (20 Dec.) 2006. ≡ *Rumicastrum translucens* (Obbens) Hershk., Phytologia 102(3): 122. (21 Sept.) 2020.

***Parakeelya umbelliformis*** (Obbens) Hershk., comb. nov. Basionym: *Calandrinia umbelliformis* Obbens, Nuytsia 22(6): 356. (18 Dec.) 2012. ≡ *Rumicastrum umbelliforme* (Obbens) Hershk., Phytologia 102(3): 122. (21 Sept.) 2020.

***Parakeelya uncinella*** (Obbens) Hershk., comb. nov. Basionym: *Calandrinia uncinella* Obbens, Nuytsia 30: 242. (15 0ct.) 2019. ≡ *Rumicastrum uncinellum* (Obbens) Hershk., Phytologia 102(3): 122. (21 Sept.) 2020.

***Parakeelya vernicosa*** (Obbens) Hershk., comb. nov. Basionym: *Calandrinia vernicosa* Obbens, Nuytsia 21(1): 15. (24 June) 2011. ≡ *Rumicastrum vernicosum* (Obbens) Hershk., Phytologia 102(3): 122. (21 Sept.) 2020.

***Parakeelya wilsonii*** (Obbens) Hershk., comb. nov. Basionym: *Calandrinia wilsonii* Obbens, Nuytsia 29: 201. (13 July) 2018. ≡ *Rumicastrum wilsonii* (Obbens) Hershk., Phytologia 102(3): 122. (21 Sept.) 2020.

**A new species of *Parakeelya***

Obbens (2022) diagnosed a syntype of *Calandrinia tepperiana* [≡ *Parakeelya tepperiana*; see Obbens & Barrett (2018)] as representing a distinct, undescribed species, which he named informally as "*Calandrinia* sp. Lennard River." This, of course, is not a validly named species (Art. 36). He indicated that the species would be formally described following additional study. In fact, Obbens (2022) provided details sufficient to formally name the species. I am utterly loathe to usurp someone else's research, having been usurped several times myself. But usurpation is not at all my objective here. All of my forays into the species taxonomy of Australian Montiaceae were undertaken with the objective of advancing the knowledge and taxonomy of Montiaceae worldwide. This has been in the face of the countercurrent efforts of the Australian specialists, whose objectives evidently were at cross-purposes. Only for the purpose of immortalizing the Australian specialists' efforts to conserve *Parakeelya* do I make an exception to my creed and publish *Parakeelya machiavelliana*.

***Parakeelya machiavelliana*** Hershk., sp. nov. TYPE: AUSTRALIA: Western Australia, Kimberly Region, 6 miles NE of Mount Eliza, near the headwaters of the Lennard River. May 1905. *W. Fitzgerald 379* (NSW).

= "*Calandrinia* sp. Lennard River Obbens" (nom. inval., Art. 36), Nuytsia 33: 147. (7 July) 2022.

**Diagnosis.** Herbaceous plants of the genus *Parakeelya* Hershk., most similar to those of *Parakeelya tepperiana* (W.Fitz) Hershk. and *P. uniflora* (F.Muell) Hershk.; differing from the former in having circular flattened and smooth-surfaced seeds rather than globular to subreniform and smooth to lightly colliculate-surfaced seeds; and differing from the latter in having multi-flowered inflorescences and brown seeds rather than 1-flowered inflorescences and black seeds.

**Etymology.** *Parakeelya machiavelliana* honors Niccolò di Bernardo dei Machiavelli, Italian diplomat, author, philosopher, and historian,[21] popularly known simply as "Machiavelli." In his work "The Prince," Machiavelli described proclivities, including manipulation and deceit, practiced with the aim of advancing political objectives. "Machiavellianism" is a neologism that captures the essence of such proclivities in political practice at societal to interpersonal scales. Nowadays, "Machiavellianism" is equated with aggressive narcissism, or sociopathy/psychopathy. Sociopaths use "Machiavellianism" to pursue their childish goals, with no concern for the havoc that they leave in their wake. Often the very virtues that they project betray their own vices. "Machiavellianism" seems to capture the essence of the Australian specialists' decades-long and finally successful political effort to formally obviate acceptance of the nomenclaturally correct name *Rumicastrum* for the Australian species of *Calandrinia* s. lato. It is fitting, therefore, to commemorate this achievement by so-naming a species of the genus that they successfully conserved.

**Acknowledgements**

As always, I acknowledge the generous support and dedicated efforts of Fundación Reshet in Chile (www.reshet.cl), as well as numerous persons in Santiago's Barrio República for giving me their lunch leftovers. I thank John McNeill (E), who, as ever, cheerfully responded to my queries in the area of plant nomenclature.

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