Taxonomic decisions and novelties in the informal *Euphorbia decaryi* group from Madagascar

By Thomas Haevermans & Wilbert Hetterscheid

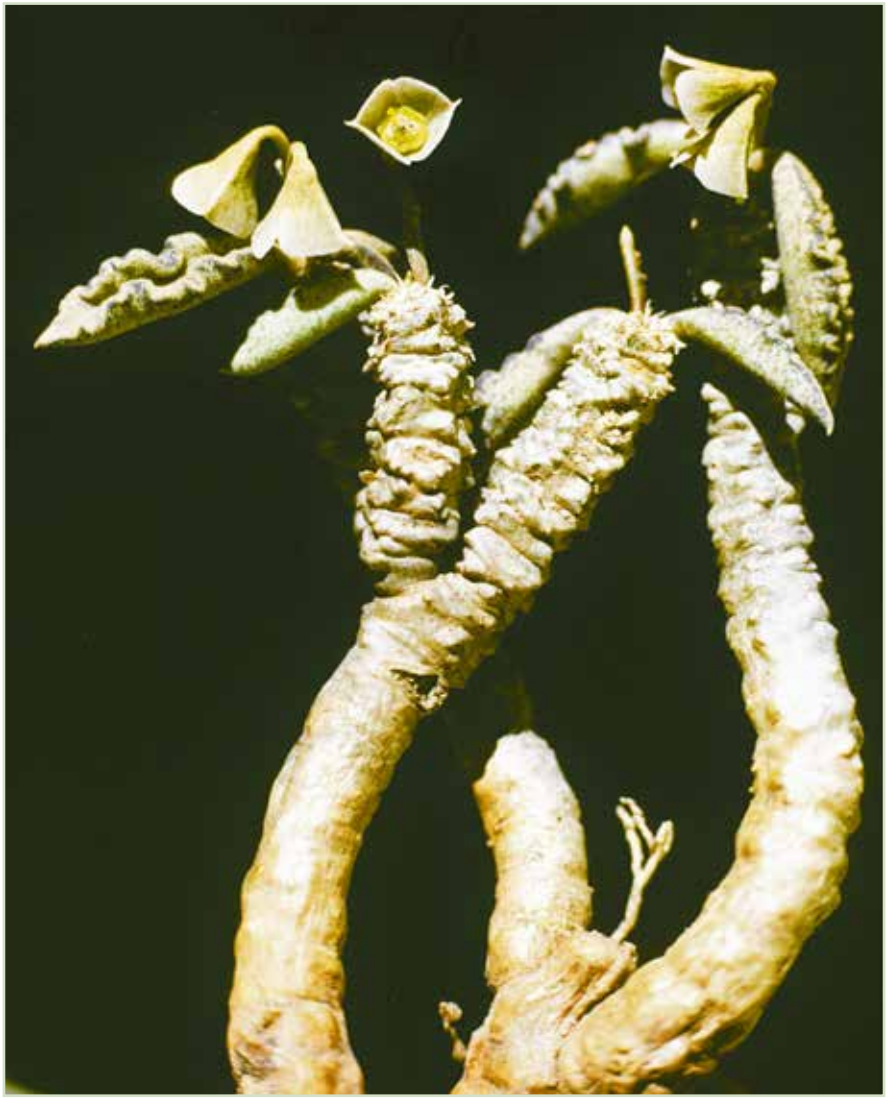


Fig. 1: Picture by Jean Bosser of (part of) the living holotype plant of E. decaryi *var.* ampanihyensis *(=* E. spirosticha*), now mounted in the Paris herbarium on sheet P00077960.*

In 2016, J.-P. and J.-B. Castillon published a paper in which confused identities of several *Euphorbia* names were clarified (Castillon & Castillon, 2016). The name *Euphorbia decaryi* Guillaumin (1934) was proven to have been misinterpreted by many authors, which lead to a new synonym for it: *Euphorbia francoisii* Leandri. In the same paper the "false *E. decaryi*" (*E. decaryi* auct., non Guillaumin) was recognised to be the species *E. boiteaui* Leandri. The wrongly identified plant(s) with the name *E. decaryi* was/were introduced into Europe by Marnier-Lapostolle and also given to Rauh (Rauh, 1961), from which cloned plants were distributed and are found today in many collections.

The original living material is still found in the Heidelberg Botanical Garden. It must have been a bit of a shock to *Euphorbia* afficionados to realise that their "proverbial" *E. decaryi* was not the correct species by that name. Two taxa previously assigned to *E. decaryi*, i.e. *E. decaryi* var. *spirosticha* Rauh & Buchloh and *E. decaryi* var. *ampanihyensis* Cremers, were transferred by

Castillon & Castillon to *E. boiteaui* as resp. *E. boiteaui* var. *spirosticha* (Rauh & Buchloh) J.-P.Castillon & J.-B. Castillon and *E. boiteaui* var. *ampanihyensis* (Cremers) J.-P.Castillon & J.-B.Castillon. A third varietal name, *E. decaryi* var. *robinsonii* Cremers, was left as was because of both authors' uncertainty as to this taxon actually being identical with either the "true" *E. decaryi*, or *E. suzanneae-marnierae* Rauh & Pétignat (this is the correct spelling of the epithet, see note below and in Castillon & Castillon [op. cit.] erroneously attributed to Rauh only), or *E. waringiae* Rauh & Gerold (also by the same authors erroneously attributed to Rauh only).

We agree with several of the decisions made by Castillon & Castillon (2016) but have a different opinion on a few others. We propose that both new varieties of *E. boiteaui* as created by Castillon & Castillon (2016) are identical taxa and below we reclassify them as *E. spirosticha* (Rauh & Buchloh) Haev. & Hett., thereby reducing *E. boiteaui* var. *ampanihyensis* to a synonym of *E. spirosticha*. Furthermore we examined the entire informal *E. decaryi* group and reached a few new taxonomic conclusions, presented below. Also a key to all species of the group is presented. We (Haevermans & Hetterscheid, 2021: 27) agreed with Castillon & Castillon on the matter of synonymising *E. francoisii* under *E. decaryi* but we elevated *E. francoisii* var. *crassicaulis* Rauh (reclassified by Castillon & Castillon as *E. decaryi* var. *crassicaulis* (Rauh) J.-P.Castillon & J.-B.Castillon) to species status as *E. crassicaulis* (Rauh) Haev. & Hett.

Varietal names associated with the name *E. decaryi*

Cremers (1984) described *E. decaryi* var. *ampanihyensis* Cremers, *E. decaryi* var. *robinsonii* Cremers and *E. decaryi* var. *cap-saintemariensis* (Rauh) Cremers. He used the original concept of *E. decaryi* (syn. *E. francoisii*) as in Guillaumin's protologue, illustrated by his mentioning of the two leaf types of *E. decaryi* and the marbling of the upper surface of its leaves. But his newly presented and/or recombined varieties of *E. decaryi* are a mixture of 3 different taxa.

Cremers' reclassification of *E. cap-saintemariensis* Rauh as a new variety of *E. decaryi* was criticised by Rauh & Buchloh (1986) and is generally not accepted, also not by us. Castillon & Castillon (2016) did not transfer *E. decaryi* var. *cap-saintemariensis* as a variety to *E. boiteaui* because they consider the taxonomic status of the first unclear. However, Rauh's *E. cap-saintemariensis* has enough unique characters to separate it from all other species in the *E. decaryi* group (see key below), so we accept its original species status as per its protologue and typification by Rauh (1970).

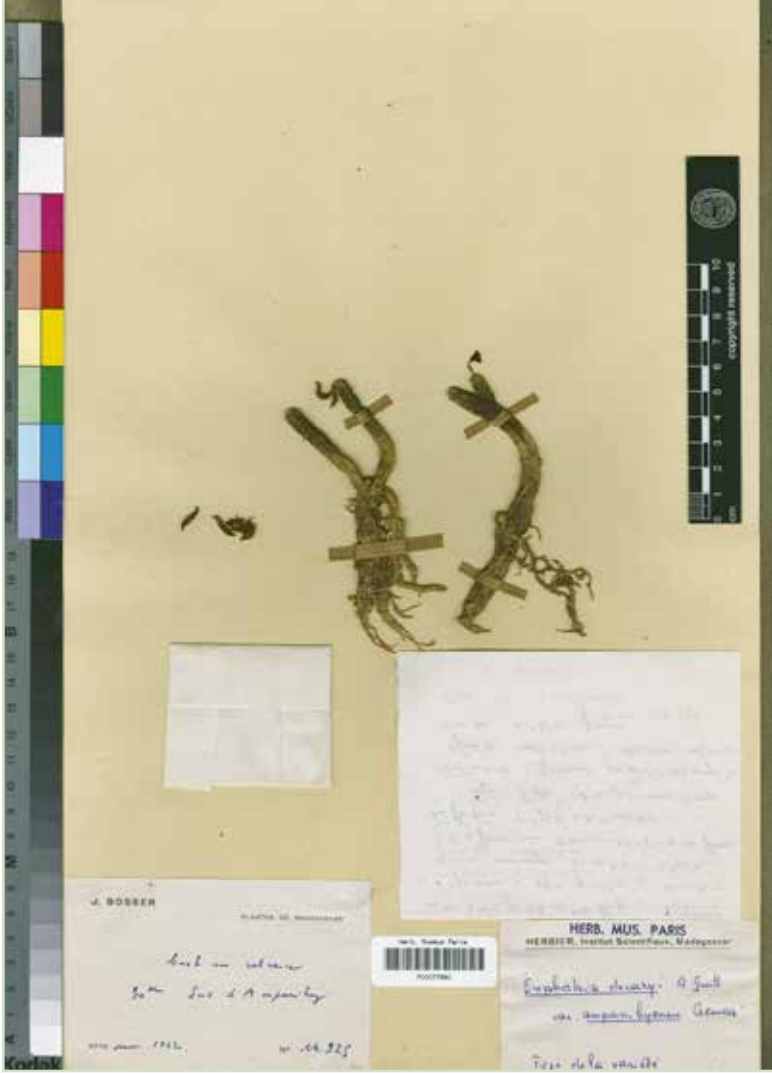


Fig. 2: One of the holotype sheets of E. decaryi *var.* ampanihyensis *(=* E. spirosticha*) P00077960, showing the mounted plant seen in Fig. 1*

Cremers' name of the new variety *E. decaryi* var. *ampanihyensis* pops up in collections and on the internet every now and then but its identity is not all that clear. Rauh & Buchloh (1986: 11) mention Cremers' variety briefly but their comment is compromised by the wrong interpretation of the name *E. decaryi* and they leave the variety as is. Castillon & Castillon (2016) reclassified the variety as *E. boiteaui* var. *ampanihyensis*, following their conclusion that *E. decaryi* auct. is actually *E. boiteaui*.

However, some characters of Cremers' var. *ampanihyensis* do not match with *E. boiteaui*, like the smaller dimensions (notably of the stem and leaves). Another character of his variety, stressed by Cremers, is the occurrence of "glands" on the cyathophylls and all over the leaves (Rauh & Buchloh 1986, surprisingly call these papillae "small hairs" in the protologue of *E. decaryi* var. *spirosticha*, where they are abundantly present all over the leaves and cyathophylls). These "glands" are in fact papillae-like enlarged, conical epidermal cells without a glandular function, as observed and extensively described for *E. tulearensis* (Rauh) Rauh by Rauh (1988). They can indeed be seen quite well on the holotype of *E. decaryi* var. *ampanihyensis* (in Paris) and on a colour

Fig. 3: E. spirosticha *showing angular stems/branches*

Fig. 4: E. spirosticha, *with young angular branches and older worn, almost smooth, semi-rounded and angular stems (compare to Fig 1) and a tuberous base.*

slide we examined, made by Bosser himself of one of the living type plants (Figs 1 and 2). Similar cells in the same density and places are found in *E. spirosticha* (Rauh & Buchloh) Haev. & Hett. (see below) and *E. durispina* Haev. & Hett. nov. spec. (see below). In a few more taxa of the *E. decaryi* group papillate cells on the surface of leaves and/or pedicels and cyathophylls are found, sometimes many as in *E. tulearensis* Rauh, or less numerous (and often smaller) or on fewer surfaces (as in *E. boiteaui* and *E. suzanneae-marnierae*).

Because of this observation, we examined the option that *E. boiteaui* var. *ampanihyensis* actually represents an already published taxon. The stoloniferous root system, the form and distribution of the papillae and the size and form of stems, stipules, leaves and cyathophylls seemed to us to indicate a close relation to *E. spirosticha*. We examined *E. spirosticha* in detail on living plants (incl. the living type clone in the Heidelberg botanical garden) and compared our observations with its protologue, and with the type and protologue of Cremers' *E. decaryi* var. *ampanihyensis*.

We found the characters of the living plants of *E. spirosticha* (notably dimensions, forms of stems, stipules,

leaves and papillae) to match *E. decaryi* var. *ampanihyensis*, but at first sight a difference seems to exist in the form of the stems. Those of *E. spirosticha* are described in the protologue (sub *E. decaryi* var. *spirosticha*) as more or less rounded, with the leaf scars in spiralling rows and no stipular remains on older parts (Rauh & Buchloh, 1986, juxtapose these characters to the angular stems and straight rows of leaf scars with prominent stipular remains of their *E. decaryi* auct. [= *E. boiteaui*]).

The stems of *E. decaryi* var. *ampanihyensis* are described and drawn by Cremers (1984) to be angular but with no stipular remains (see Fig. 1 for one of the holotype plants in living condition). However we found living specimens of *E. spirosticha* to develop angular stems and all intermediate stages from the typical tight spirals to spirals with a much lower angle to almost and finally straight (orthostichous; see Figs 3 and 4). We must keep in mind that after Rauh & Buchloh, no plants exactly similar to their variety have ever been found again but for a recent occasion by Mr. Petr Pavelka (Czech Rep., Fig. 5), so there is quite a bias towards accepting *E. spirosticha* exactly as described in the protologue. Similar flexibility of this stem character was also observed by us in *E. boiteaui* (*E. decaryi* auct.), where the angular, crested stems show the leaf scars and crests both spiralling (spirostichous, as per the protologue by Leandri, 1946) and/or in vertical rows (orthostichous), see Figs 6 and 7.

Variation in characters in *E. spirosticha* seems more frequent than described so far. We observed this variation on plants, figured here, in the collection of the National Tree Museum Gimborn in the Netherlands. We also noticed a new character of *E. spirosticha*, not mentioned by Rauh & Buchloh, which is the possibility of the roots becoming tuberous with age (see Fig. 4). This was also observed by us on a picture on Pinterest (https://nl.pinterest.com/pin/157274211970394871/). We have never observed seedlings of *E. spirosticha*, so we do not know whether the tuber formation is part of the normal life cycle, instead of secondary appearance in older cuttings. In the first instance *E. spirosticha* would show a similar behaviour as *E. cylindrifolia* Rauh & Marnier-Lapostolle, developing a tuber as well as stolons.

Rauh & Buchloh (1986) also comment on Cremers' *E. decaryi* var. *ampanihyensis* stating that it differs from the typical variety of *E. decaryi* (auct.) by the fascicled roots (apparently as opposed to rhizomatous roots in the type variety). They mention Cremers' drawing of the new variety to prove the case of the "fascicled roots", but the

Fig. 5: E. spirosticha, *plants in a population south of Ampanihy, 2007 (copyright P. Pavelka).*

Fig. 6: E. boiteaui, *plant with strongly spiralling rows of podaria*

Fig. 7: E. boiteaui, *plant with almost straight rows of podaria*

drawing also and unequivocally shows the stoloniferous nature of the variety, which can also be seen very well in its holotype. It must be said that, surprisingly, Cremers does not mention this character in the protologue but he uses it in his identification key to the species treated in his paper (also overlooked by Rauh & Buchloh).

In conclusion, examination of the type of *E. decaryi* var. *ampanihyensis* (Bosser 16925, Paris, Mus. Natl. d'hist. Nat., P00077959 & P00077960), of the protologue (Cremers, 1984), the accompanying drawing and all observations and conclusions mentioned above, lead us to suggest that *E. decaryi* var. *ampanihyensis* of Cremers (1984) is the same taxon as *E. decaryi* var. *spirosticha* of Rauh & Buchloh (1986).

Fig. 8: Holotype of E. decaryi *var.* robinsonii *(in Paris)*

We also conclude that this taxon deserves species status as it exhibits clear and stable differences from all other species of the *E. decaryi* group, notably from its morphologically closest ally *E. boiteaui* (like its significantly smaller dimensions and lack of crest-forming stipular remains as found in *E. boiteaui*, see Figs 6 and 7).

We choose to retain the epithet "*spirosticha*" because it is much more widely known than "*ampanihyensis*". The resulting nomenclature is:

Euphorbia spirosticha (Rauh & Buchloh) Haev. & Hett., comb. & stat. nov. – Basionym: *E. decaryi* var. *spirosticha* Rauh & Buchloh (1986), in: Cact. & Succ. Journ. (U.S.) 58: 9, (1986). Typus: Madagascar, southwest, near Ampotaka (south of Ampanihy), at the Manarandra River, 5 Nov. 1961, Rauh & Buchloh 7599 (holotype HEID, spirit coll.). Map 1.

= *E. boiteaui* var. *spirosticha* (Rauh & Buchloh) J.-P. Castillon & J.-B.Castillon, in: Candollea, 71(1): 156 (2016), syn. nov.

= *E. decaryi* var. *ampanihyensis* Cremers, in: Bull. Jard. Bot. Natl. Belg. 54: 373 (1984), syn. nov. – Typus: Madagascar, southwest, bush on limestone, 30 km south of Ampanihy, Nov. 1962, Bosser 16925 (holotype MNHN, P00077959 & P00077960 [of the latter, a colour slide by Bosser of the living type plant remains in the Paris herbarium], iso- in TAN, seen and photographed by TH).

= *E. boiteaui* var. *ampanihyensis* (Cremers) J.-P. Castillon & J.-B.Castillon, in: Candollea, 71(1): 156 (2016), syn. nov.

This leaves the nomenclature of *E. boiteaui* as:

Euphorbia boiteaui Leandri in Not. Syst. (Paris) 12: 163 (1946). Typus: Madagascar. Prov. Toliara: Vallée Moyenne du Mandrare, près d'Anadabolava, 200-250 m, XII.1933, Humbert 12484 (holo-: P [P00077901]!; iso-: P[P00077902, P00077903]!). Map 1.

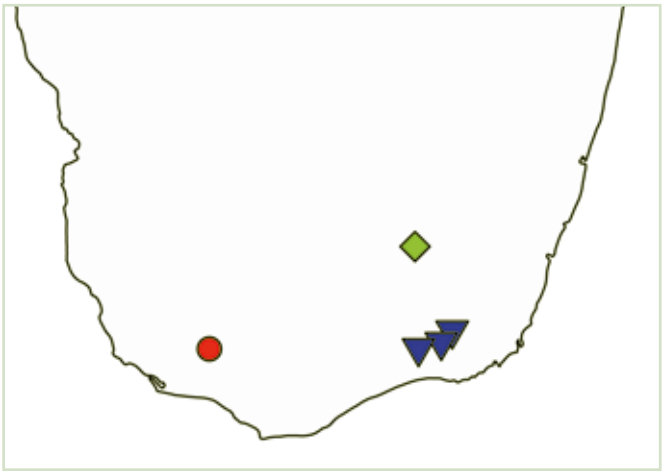
= *E. decaryi* auct., non Guillaumin (1934).

Cremers (1984) also described a new variety, *E. decaryi* var. *robinsonii*, typified by Robinson s.n. (type in P, P00077962, Fig. 8) collected from the botanical garden in Tsimbazaza and reported to have originated from "Tulear". Castillon & Castillon (2016) decided not to transfer Cremers' variety to either *E. boiteaui* or to any other species of this group of dwarf species because among other things the locality "Tulear" of the type would be too imprecise (indicating either the direct surroundings of the town of Toliara, where they could not find it, or any place in the province Toliara, extending from the town Toliara to Taolagnaro [Ft. Dauphin]), a huge distance further to the east. They do not mention the extra data on the distribution as cited by Cremers from two cited additional specimens of his variety, "Sur rochers calcaires à Barahill, Baie de St Augustin (S de Tulear), Rakotozafy 1274 (TAN); "pied de la Table, E de Tulear, Cremers 2873 (TAN)".

Unfortunately neither specimen could be traced in TAN upon our request, so these geographical data remain unusable as we do not know for sure if Cremers' identification of the two specimens is correct. Additionally, Castillon & Castillon (2016) state that no specimen of the variety has been found by them on several visits to La Table near Tulear. For this reason and similarities with three species (*E. decaryi*, *E. suzanneae-marnierae* and *E. waringiae*) they decided to maintain the varietal name as proposed by Cremers because the similarity with *E. decaryi* (sensu Guillaumin) is strong.

That said and contrary to Castillon & Castillon (2016), we think that despite the geographical uncertainty, *E. decaryi* var. *robinsonii* can reliably be recognized as *E. suzanneae-marnierae*. The protologue and drawing of the variety in Cremers (1984) contain enough clues. The protologue and holotype (Fig. 8) of *E. decaryi* var. *robinsonii* indicate that we must look among species from the *E. decaryi* group for a taxon with a tuberous root and long-(sub-)petiolate leaves with a narrow, lanceolate-elliptic to narrowly rhombic blade with undulating margin and notably the upper surface with "glands" (= papillae, see above), and with straw-like, entire-margined stipular fringes.

Euphorbia waringiae can be ruled out for it never has leaves with a rhombic blade (only narrowly lanceolate to linear) and the stipular fringes have fringed margins themselves (Fig. 9), whereas Cremers' *E. decaryi* var. *robinsonii* has stipular fringes with entire margins (well visible on the type specimen). *Euphorbia decaryi* (sensu Guillaumin, syn. *E. francoisii*) shows a very large range of leaf lamina shapes, among which are lanceolate and rhombic ones as in Cremers' *E. decaryi* var. *robinsonii*, but it always has a perfectly smooth, often even glossy, upper leaf surface without any indication of papillae. Cremers also clearly states that var. *robinsonii* is significantly smaller than the typical variety of *E. decaryi*. As stated above, Cremers' interpretation of the name *E. decaryi* (var. *decaryi*) complies with Guillaumin's, so his stated differences of var. *robinsonii* with *E. decaryi* are correct.



Map 1: Occurrences of E. spirosticha *(red dot),* E. boiteaui *(green diamond),* E. durispina *(blue triangles) in the southern part of the Toliara Province*

Fig. 9: E. waringiae, *top of a branch showing podarium appendages with fringed margins.*

Fig. 10: E. crassicaulis *(plant in cultivation)*

In spite of this, Cremers (1984) uses the name *E. francoisii* var. *francoisii* separate from *E. decaryi* in the same paper, but his concept of the first name is probably based on *E. crassicaulis*, as can be deduced from his drawing of *E. francoisii* var. *francoisii* on p. 376. The drawing is based on a specimen "Peyrieras s.n." but unfortunately this specimen could not be located in TAN. Because of the probably close relationship of *E. crassicaulis* to *E. decaryi*, we may also consider *E. crassicaulis* as a candidate for Cremers' variety, but the leaf shape of *E. crassicaulis* differs considerably, being broadly oblong, nearly sessile with a truncated base and much larger in size (Fig. 10).

That leaves *E. suzanneae-marnierae* to consider. The result of a comparison we made between it and *E. decaryi* var. *robinsonii* is that all characters of the latter match perfectly with *E. suzanneae-marnierae*, including the papillate upper leaf surface and the peculiar narrow leaves with the blade being narrowly rhombic and with a short or longer petiolar base (Fig. 10).

In cultivation, *E. suzanneae-marnierae* tends to grow erect and stoloniferous (Figs 11 and 12), the latter also visible in photographs taken by Mr. Petr Pavelka of plants growing in the Pétignat arboretum in Tulear (Fig. 13), where the species shows a scrambling habit with additional rooting on low growing side branches touching the soil. In conclusion we present our classification of *E. decaryi* var. *robinsonii* as follows:

Euphorbia suzanneae-marnierae Rauh & Pétignat in Rauh & Teissier (1996) ("*suzannae-marnieriae*", see note below), Succulentes 19(2): 10. Typus: Madagascar, central near Anadabolava (Toliara Province, formerly Tuléar), north of Amboasary, in the middle of the valley of the Mandrare, in deciduous forest, Nov. 1993, Petignat 397 (holotype HEID, in spirit coll.).

= *E. decaryi* var. *robinsonii* Cremers, Bull. Jard. Bot. Nat. Belg. 54(3/4): 373 (1984), syn. nov. Type: Madagascar, Toliara, collected from the botanical garden of Tsimbazaza, nr. 76, Robinson s.n. (holotype MNHN, P [P00077962]).

Note: From its first introduction by Rauh & Pétignat (in Rauh & Teissier, 1996) onward, the spelling of the species' epithet in publications has always been contrary to the ICN (Turland et al., 2017). Rauh & Pétignat (1996) presented the name as *E. suzannae-marnieriae*, honouring the name of Suzanne Marnier. Their spelling indicates that both the surname and the family name are treated as independent words (as per

the ICN) because they are separately Latinised. This means that the hyphen is to be accepted (Turland et al., 2017: Art. 60.11, ex. 41). However the name Suzanne was wrongly Latinised as "*suzannae*" instead of "*suzanneae*" and the Latinisation of the name Marnier, if of a female person, ought to read "*marnierae*" instead of "*marnieriae*", resulting in the correct epithet "*suzanneae-marnierae*".

Introducing a new species in the *E. decaryi* group

Recent years saw the introduction into cultivation of plants labelled *E. decaryi* var. *durispina*, a nomen nudum because it was never published. The cultivated plants originate from the famous German succulent nursery Exotica (unfortunately no longer in operation for the general public) and when still equipped with the original nursery label, such plants bear the number ES 12641, the acronym standing for the name Ernst Specks, one of the owners of the nursery. In a database by Exotica it is mentioned that this ES number corresponds to "Heidelberg 74941". This number exists in the online database of Heidelberg Botanical Garden (https://botgart.cos.uni-heidelberg.de/Sammlungen.php) as a so-called "pseudo-Rauh" number (see also http://wrhp.cos.uni-heidelberg.de/scriptorium/index.php#) but refers to a *Kalanchoe* species or *Euphorbia perrieri* Denis. Nowhere in Rauh's notebooks could we find this number referring to the name *E. durispina*.

We earlier felt that the plants from Exotica represent a new taxon but refrained from publishing it because of the lack of any known natural origin or collector. Recently we examined a series of pictures of Malagasy euphorbias sent to us by Mr. Petr Pavelka and identified plants on pictures from north of Amboasary as this "*durispina*" (Fig. 14). Leaves of plants in cultivation show a dense covering of acute-tipped papillae, sometimes even with a very short, hair-like extension, similar to the situation in *E. spirosticha*, but the latter has papillae with a rounded top. We used this character to re-examine herbarium material in MNHN and found that one specimen, Rakotomalaza 596 from

Fig. 11: E. suzanneae-marnierae, *erect habit of part of the type clone in Heidelberg Bot. Gard. (2008)*

Fig. 12: E. suzanneae-marnierae, *stoloniferous habit of part of the type clone in Heidelberg Bot. Gard. (2008)*

Fig. 13: E. suzanneae-marnierae, *plant growing in the Pétignat Arboretum in Tulear (copyright P. Pavelka).*