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# New Combinations in the Genus *Neomarica* (Iridaceae) and Its Segregation from *Trimezia* on the Basis of Morphological Features

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**ABSTRACT.** This paper recognizes the genus *Neomarica* Sprague (Iridaceae), contradicting the treatment by Ravenna placing the genus in synonymy under *Trimezia* Salisbury ex Herbert. *Neomarica* is distinguished by its caulinar system as a rhizome or corm, equitant and conduplicate leaves, and conduplicate scapes with a leaflike bract in the apex, which apparently is a sterile prolongation of it; *Trimezia* is characterized by the exclusive presence of corms, spiraled disposition of cataphylls and leaves, and terete scapes. As a result of this work, nine new combinations and five new synonyms are proposed.

**Key words:** Iridaceae, *Neomarica*, *Trimezia*.

The genera *Neomarica* Sprague and *Trimezia* Salisbury ex Herbert had always been considered as distinct, if closely related, genera until recently (Klatt, 1861–1862, 1871; Baker, 1877, 1892; Benthams & Hooker, 1883; Hutchinson, 1934; Goldblatt, 1982, 1990; Henrich & Goldblatt, 1987; Rudall, 1994). The name *Neomarica* was first proposed by Sprague (1928), following Baker (1877, 1892), based on Herbert's (1840) review for *Marica*; Herbert (and Baker) differentiated *Marica* from *Lansbergia* (= *Trimezia*) on the basis of the presence of conduplicate and equitant leaves and scapes. *Trimezia* was characterized by the presence of spirally arranged cataphylls, terete or linear leaves, terete scapes, and deeply bifid styles (Herbert, 1844; Benthams & Hooker, 1883).

The name *Marica* was initially proposed by Schreber (1789) in order to replace *Cipura* Aublet (Aublet, 1775), only because Schreber did not like the name *Cipura*. He used the same holotype of *Cipura*, and therefore it is illegitimate. Even so, *Marica* was adopted during the period from 1803 to 1827 by Ker Gawler, in such a broad sense that today it would embody nine dif-

ferent genera and include *Marica paludosa* Schreber, the type species of *Cipura* Aublet and *Marica* Schreber. According to Sprague (1928), Herbert (1840) completely changed the original application of *Marica* by excluding *M. paludosa* and typifying the genus to *Marica northiana* (Schneevoogt) Ker Gawler. In Sprague's view, Herbert thus established a new genus requiring a new name.

According to Ravenna (1988), exceptions can be found in the diagnostic characters listed above, as for example in *Trimezia violacea* (Klatt) Ravenna, which he considered to have equitant cataphylls, and in *T. rupestris* Ravenna and *T. paradoxa* Ravenna, which he considered to have spirally arranged cataphylls. As a result, Ravenna (1988) placed *Neomarica* under *Trimezia* recognizing sections *Neomarica*, *Juncella*, *Platyella*, and *Calolirion*. Ravenna's treatment of *Neomarica* and *Trimezia* (1977) was not accepted by such other authors as Goldblatt (1982) and Henrich and Goldblatt (1987).

The use of the name corm for the subterranean caulinar system was based on Chueiri-Chiaretto and Menezes (1980) and Chueiri-Chiaretto (1987), who have studied the anatomy of the underground structure of *Trimezia*, which is here also applied to *Neomarica* species.

## MATERIAL AND METHODS

This work followed classic methodology for taxonomic studies, associating herbarium research with field trips. Three *Trimezia* species were examined from among 17 recognized for the genus and 9 species from *Neomarica*, which are listed below: *Trimezia juncifolia* (Klatt) Benthams & Hooker, *Trimezia fistulosa* Foster var. *fistulosa*, *Trimezia violacea* (Klatt) Ravenna, *Neomarica rupestris* (Ravenna) Chukr, *Neomarica paradoxa* (Ravenna)



Chukr, *Neomarica sabini* (Lindley) Chukr, *Neomarica caulosa* (Ravenna) Chukr, *Neomarica sylvestris* (Vellozo) Chukr, *Neomarica rotundata* (Ravenna) Chukr, *Neomarica portosecurensis* (Ravenna) Chukr, *Neomarica fluminensis* (Ravenna) Chukr, and *Neomarica nitida* (Ravenna) Chukr.

Patterns of shapes and sizes of caulinar systems, leaves, scapes, inflorescences, bracts, tepals, stamens, and styles of *Trimezia* and *Neomarica* species were observed. Observations of the color of the flowers and stripes on outer and inner tepals, and the type of style apex and stamens were recorded from field populations, when possible. The field studies took place in Serra do Cipó, Minas Gerais (Chukr, 1992), Espinhaço Range in the States of Minas Gerais and Bahia, and in Atlantic Forest, mostly in the southeast of Brazil. The herbaria consulted for this work were: BHMH, BR, CEPEC, F, HB, K, M, MBM, NY, R, RB, SP, SPF.

## RESULTS AND DISCUSSION

In *Trimezia violacea*, the underground systems were found to consist of a corm with spirally arranged cataphylls (Fig. 1c). This contradicts the findings of Ravenna (1988), who regarded this species as possessing a rhizome. However, in this species the cataphylls are less fibrous, perhaps due to the wet conditions where the plant usually occurs. In species growing in more arid areas, the cataphylls are invariably more fibrous.

An examination of the underground structures of *Trimezia rupestris* and *T. paradoxa*, both species here considered as belonging to *Neomarica*, clearly showed the cataphylls to be equitant and not spiraled, as proposed by Ravenna (1988). However, unusually for *Neomarica*, these two species were found to possess corms rather than rhizomes.

Comparing "*Neomarica*" *rupestris* (Fig. 1a) with a typical *Trimezia* species, such as *T. fistulosa* Foster. var. *fistulosa* (Fig. 1d), the different arrangement of the cataphylls in the corm can be seen. In the former species the typical distichous *Neomarica* arrangement of the leaves may be observed, not the spiral arrangement found in *T. fistulosa* var. *fistulosa* and other typical *Trimezia* species, such as *T. jun-cifolia* (Klatt) Benth. & Hooker (Fig. 1b).

From the studies we undertook, it is now possible to itemize the main vegetative differences between *Trimezia* and *Neomarica* (Table 1). During these studies, other diagnostic characters were discovered: in *Neomarica*, the scapes are flattened with a pseudo-midrib, while in *Trimezia* these are always terete. This is of particular value as a field character, and is also easily seen in herbarium material.

While vegetative characters provide good diagnostic characters to separate the two genera, the floral morphology was found to be of little systematic value. However, the inflorescence type gives some taxonomic clues. In *Neomarica* the inflorescence is lateral (Table 1), while in *Trimezia* this character is not common. Also the presence of a terminal bract on the scape occurs in all *Neomarica* species, while in *Trimezia* it occurs in only about 30% of species (Table 1). This pattern is well known in Iridaceae, where floral characters were found to be of little value to separate *Homeria* and *Moraea* (Goldblatt, 1986), or *Gynandris*, *Mastigostyla*, and *Moraea* subg. *Viesseuxia* (Ravenna, 1981).

As a result of the above findings, it seems clear that *Neomarica* is a genus distinct from *Trimezia*.

**Neomarica** Sprague, Bull. Misc. Inform. Kew 1928(7): 280. 1928. TYPE: *Neomarica northiana* (Schneevoogt) Sprague (basionym: *Moraea northiana* Schneevoogt, Ic. Pl. Rar., tab. 41, 42. 1793. 1793).

*Galathea* Liebm., Ind. Sem. Hort. Haun. 26. 1855. TYPE: *Galathea speciosa* Liebm.

*Trimezia* Salisbury ex Herbert sect. *Calolirion* Ravenna, Onira 1(1): 15. 1988. Syn. nov. TYPE: *Trimezia caerulea* (Ker Gawler) Ravenna (basionym: *Marica caerulea* Ker Gawler, Edward's Bot. Reg., tab. 713. 1823).

*Trimezia* Salisbury ex Herbert sect. *Platyella* Ravenna, Onira 1(1): 15. 1988. Syn. nov. TYPE: *Trimezia paradoxa* Ravenna.

Underground system a rhizome, or rarely, corm with cataphylls equitant; leaves ensiform, equitant and conduplicate; scapes foliaceous, flattened and conduplicate, apex with two bracts, lower larger and appearing as a continuation of the scape; flowers white, blue or yellow, fugaceous, outer tepals very different from the inner in shape and size, inferior region of the outer tepals with wine-colored stripes and capitate hairs, medium and superior regions of the inner tepals with wine-colored stripes and capitate hairs, stamens opposite the styles, styles entire, trifold or bifid at the apex; fruit a loculicidal capsule.

According to Henrich and Goldblatt (1987), *Neomarica* has a neotropical distribution with ca. 15 species widespread on the east coast of Brazil, in the states of Bahia, Espírito Santo, Rio de Janeiro, São Paulo, Minas Gerais, Paraná, and Santa Catarina, in restingas areas or in forest borders.

**1. *Neomarica caulosa*** (Ravenna) Chukr, comb. nov. Basionym: *Trimezia caulosa* Ravenna,



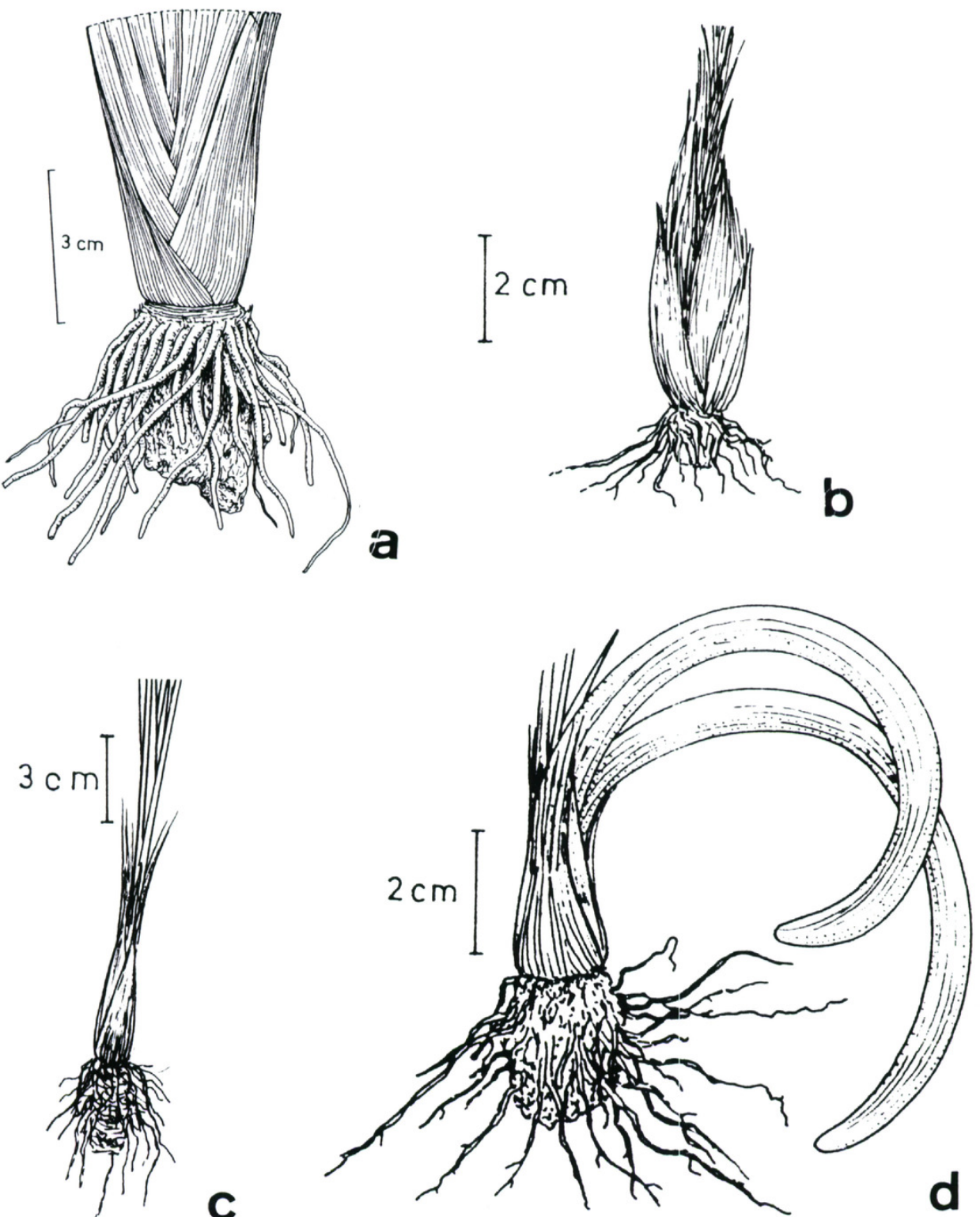


Figure 1. Subterranean systems. —a. *Neomarica rupestris* (Ravenna) Chukr: corm and equitant leaves. —b. *Trimezia juncifolia* (Klatt) Bentham & Hooker: corm and spiraled leaves. —c. *Trimezia violacea* (Klatt) Ravenna: corm and spiraled leaves. —d. *Trimezia fistulosa* Foster var. *fistulosa*: corm and spiraled leaves.

Wrightia 7(2): 94. 1982. TYPE: Brazil. Bahia: Porto Seguro, 3 Nov. 1978, A. Espunino 368 (holotype, Herb. Ravennae not seen).

The paratype's underground system, which is a short rhizome, left doubts as to the generic position

of this material, but the equitant disposition of the leaves and the flattened scape definitively placed it in *Neomarica*.

Paratype. BRAZIL. Bahia: Santa Cruz da Cabralia, 15 Sep. 1971, T. S. Santos 1924 (CEPEC).



Table 1. Distinguishing characters between *Neomarica* and *Trimezia*. Legend: % = percentage of occurrence in the species of the genus.

Characters	<i>Trimezia</i>	<i>Neomarica</i>
Type of underground system	Corm	Rhizome or corm
Presence of corm (%)	100	10
Cataphylls arrangement	Spiral	Equitant
Leaf form	Plane or terete	Ensiform
Conduplicate leaves (%)	0	100
Scape form	Terete	Flattened
Foliaceous scape (%)	0	100
Terminal bract on the scape (%)	30	100
Lateral inflorescence (%)	30	100

**2. *Neomarica fluminensis*** (Ravenna) Chukr, comb. nov. Basionym: *Trimezia fluminensis* Ravenna, Onira 1(1): 10. 1988. TYPE: Brazil. Rio de Janeiro: Estrada da Vista Chinesa, 15 Sep. 1971, *G. Martinelli et al.* 58 (holotype, RB).

The analysis of the holotype of *Trimezia fluminensis* revealed a rhizome system, conduplicate and flattened leaves and scapes, lateral inflorescences, and equitant cataphylls. *Neomarica fluminensis* is similar to *Neomarica sabini* but differs in the smaller size of individuals and in the anatomical features from the endodermal line.

**3. *Neomarica nitida*** (Ravenna) Chukr, comb. nov. Basionym: *Trimezia nitida* Ravenna, Onira 1(1): 8–9. 1988. TYPE: Brazil. São Paulo: São Paulo, Feb. 1966, *Ravenna* 492 (holotype, Herb. Ravennae not seen).

This species was examined from several paratypes housed in SP. Species characteristics corroborate its inclusion in *Neomarica* because of the presence of a rhizome, equitant and conduplicate leaves, conduplicate scapes, and a lateral inflorescence.

*Paratypes.* BRAZIL. **São Paulo:** Paranapiacaba, Jan. 1913, *Luederwaldt* 1181 (SP); São Paulo, *O. Handro* s.n. (SP 69.764); São Paulo, Ilha Queimada Grande, Apr. 1923, *Dr. Apicurio* 15 (SP).

**4. *Neomarica paradoxa*** (Ravenna) Chukr, comb. nov. Basionym: *Trimezia paradoxa* Ravenna, Onira 1(1): 4. 1988. TYPE: Brazil. Maranhão: Pastos Bons, Mar. 1966, *Ravenna* 475 (holotype, Herb. Ravennae not seen; isotypes, K, RB not seen).

The isotype of *Trimezia paradoxa* Ravenna was analyzed by photography (*Ravenna* 475, K). It is evidently a species of *Neomarica* due to its flat-

tened scape and lateral and axillary inflorescences. The styles are entire in the apex, a feature that is diagnostic for this species.

**5. *Neomarica portosecurensis*** (Ravenna) Chukr, comb. nov. Basionym: *Trimezia portosecurensis* Ravenna, Onira 1(1): 7–8. 1988. TYPE: Brazil. Bahia: Santa Cruz da Cabralia, 17 Oct. 1971, *T. S. Santos* 1954 (holotype, Herb. Ravennae not seen; isotype, CEPEC).

The isotype and paratypes of this species were examined. It was possible to verify the major characteristics of *Neomarica*, such as the conduplicate scape and the rhizome as the underground system. The other major characteristic of the species is the trifid apex of the style, where the lateral branches are smaller than the central one.

*Paratypes.* BRAZIL. **Bahia:** Santa Cruz da Cabralia, 18 Oct. 1973, *A. Eupurino* 384 (CEPEC, RB), 19 Oct. 1978, *S. A. Mori et al.* 10849 (CEPEC, RB).

**6. *Neomarica rotundata*** (Ravenna) Chukr, comb. nov. Basionym: *Trimezia rotundata* Ravenna, Onira 1(1): 2–3. 1988. TYPE: Brazil. Paraná: Garuva, Dec. 1969, *Ravenna* 760 (holotype, Herb. Ravennae not seen; isotypes, BR not seen, K, MBM not seen, RB not seen).

This species belongs to *Neomarica*, because it possesses a rhizome, conduplicate scape, and ensiform leaves.

**7. *Neomarica sabini*** (Lindley) Chukr, comb. nov. Basionym: *Marica sabini* Lindley, Trans. Hort. Soc. London 6: 75, tab. 1. 1826, non *Marica sabini* Loddiges, 1826. *Trimezia sabini* (Lindley) Ravenna, Extinction is Forever: 257. 1977. TYPE: Trans. Hort. Soc. London 6: 75, tab. 1. 1826.

The name *Marica sabini* Lindley was applied to



materials with *Neomarica* characteristics such as the presence of conduplicate leaves and scapes and a rhizome as a subterranean caulinar system. Ravenna (1977) proposed the species transfer to *Trimezia* and used the name *T. sabini* (Lindley) Ravenna to identify the materials *S. G. Vinha* & *T. S. Santos 166* (CEPEC, RB). The taxon typically has an inflorescence with three or more rhipidiums, one being sessile to the leaf-like bract and the other pedunculate.

**8. *Neomarica sylvestris*** (Vellozo) Chukr. comb. nov. Basionym: *Iris sylvestris* Vellozo, Fl. Flum.: 34. 1829; Icones, tab. 82. 1831. *Trimezia sylvestris* (Vellozo) Ravenna, Extinction is Forever: 257. 1977. TYPE: Fl. Flum.: 34. 1829; Icones, tab. 82. 1831.

*Neomarica heloisamariae* Occhioni, Rodriguesia 10(20): 80. 1946. Syn. nov. TYPE: Brazil. Rio de Janeiro, Sep. 1945, *Occhioni s.n.* (holotype, RB 56.701 RB).

*Iris sylvestris* was described by Vellozo (1829) based on material from Rio de Janeiro. The characteristics of the species, however, place it in *Neomarica*, especially its underground system in the form of a rhizome, its flattened scape, and the lateral and axillary inflorescence. Vellozo (1829) erred when he put the species in *Iris* because it does not have enlarged or petaloid styles. *Neomarica sylvestris* is well delimited in the genus because of its short height and sessile lateral inflorescence. The species is widespread in the state of Rio de Janeiro, in restingas, and is also found in the state of São Paulo.

Occhioni (1946) proposed the taxon *Neomarica heloisamariae* based on material from Rio de Janeiro. Our analysis of the *N. heloisamariae* material did not show significant differences from *N. sylvestris*, so *N. heloisamariae* is here considered a synonym.

**9. *Neomarica capitellata*** (Ravenna) Chukr. comb. nov. Basionym: *Trimezia capitellata* Ravenna, Onira 1(1): 2. 1988. TYPE: Brazil. Minas Gerais: Itacambira, Serra dos Alagoas, Jan. 1963, *Ravenna 197* (holotype, Herb. Ravennae not seen).

The holotype of *N. capitellata*, as indicated to be in the Ravennae Herbarium, could not be examined, because the material from the state of Minas Gerais was not sent to be analyzed. However, the original description leaves no doubt of the inclusion of the material in *Neomarica*, especially because of the inflorescence arrangement in an axillary position relative to the leaflike bract, and the rhizome system.

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