

TWO NEW SYNONYMS IN *OXOSSIA* (TURNERACEAE, PASSIFLORACEAE S. L.)

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Abstract. The transfer of *Turnera acangatinga* and *T. ibateguara* to the genus *Oxossia*, as synonyms of the names *O. annularis* and *O. pernambucensis* (Turneraceae, Passifloraceae s. l.), respectively, is proposed herein.

Resumo. Propõe-se a transferência de *Turnera acangatinga* e *Turnera ibateguara* para o gênero *Oxossia*, como sinônimos para os nomes *Oxossia annularis* e *Oxossia pernambucensis* (Turneraceae, Passifloraceae s. l.), respectivamente.

Keywords: Genus *Turnera*, Malpighiales, nomenclature, Brazilian rainforests

Phylogenetic relationships within Turneraceae have been increasingly elucidated through analyses involving large datasets based on morphology and DNA (Truyens et al., 2005; Thulin et al., 2012; Tokuoka, 2012; Rocha et al., 2019). Currently, the family is considered monophyletic (Thulin et al., 2012) but remains included in the broad circumscription of Passifloraceae (sensu APG IV, 2016). Turneraceae covers 14 genera (sensu Rocha et al., 2019) with predominantly Neotropical distribution, occurring in a variety of environments, but most species are found in areas of savanna vegetation (Cerrado domain) or dry forest (Caatinga domain) (Arbo and Mazza, 2011). Recently, 15 species of the genus *Turnera* L. were circumscribed in a new genus *Oxossia* L. Rocha. The genus includes all species previously included in *Turnera* ser. *Capitatae* Urb. (11 spp.), *T.* ser. *Conciliatae* Arbo (1 sp.), part of *T.* ser. *Annulares* Urb. (1 sp.), and *T.* ser. *Microphyllae* Urb. (2 spp.) (Rocha et al., 2019).

Oxossia is endemic to Brazil, occurring mainly in the rainforests and sandbanks (restingas) of the Atlantic Forest and the Amazon. This genus can be easily recognized by the combination of conspicuous stipules and bracts, inflorescences in elongated to abbreviated racemes, head-like, spike-like, terminal or lateral flowers with white corolla and sometimes yellow base, stamens pilose, adnate only at the base to the floral tube, styles pilose, sometimes geniculate, and seeds with prominent chalaza and concave surface (Rocha et al., 2019).

Species in Turneraceae frequently exhibit wide morphological variation. This variation can be evident in the height and density of the branches, e.g., *Oxossia calyptrocarpa* (Urb.) L. Rocha and *O. maracasana* (Arbo) L. Rocha, ranging from 0.2 to 2.5 m tall depending on the environment; (sub)glabrous to tomentose indumentum, e.g., *O. calyptrocarpa* and *Turnera melochioides* Cambess.; leaf shape, e.g., *T. subulata* Sm., *T. ulmifolia* L., and so many others from *T.* ser. *Turnera*; even the color of the petals, e.g., *T. incana* Cambess., which presents white to lilac petals (Arbo, 2000, 2005, 2008; Rocha and Rapini,

2015). Morphological variation within the same species in *Oxossia* may also be pronounced, especially among widely distributed populations. *Oxossia calyptrocarpa*, for example, has high plasticity in leaf morphology, regarding the blade size (4–33 × 2–18 mm) and phyllotaxis (congested in terminal brachyblasts or with long internodes), in addition to the inflorescence arrangement pattern (solitary or congested at the apex of brachyblasts) (e.g., Arbo, 2000; Rocha and Rapini, 2015).

Some species of *Oxossia* were known to have few representative specimens or were known only from the type, for example, *O. hatschbachii* var. *miniata* (Arbo) L. Rocha, *O. princeps* (Arbo) L. Rocha, and *O. pernambucensis* (Urb.) L. Rocha. Recently, Zelenski et al. (2016) rediscovered *O. pernambucensis* in the state of Pernambuco and provided a detailed discussion of the species' morphological limits. On the basis of specimens analyzed by Zelenski et al. (2016) and some additional collections from the Atlantic Forest of northeastern Brazil, Costa-Lima and Chagas (2019) proposed a new species but incorrectly included it in the genus *Turnera*: *T. ibateguara* Costa-Lima & E.C.O. Chagas. In the same study, the authors proposed another new species with specimens corresponding to *T. annularis* var. *conglomerata* Urb., which was called *T. acangatinga* Costa-Lima & E.C.O. Chagas.

The species proposed by Costa-Lima and Chagas (2019) belong to the genus *Oxossia* because of the presence of generally developed stipules, (0.5–)1.5–3.0 mm long, conspicuous bracts (3–14 mm long), flowers with white corolla, stamens and styles pilose, the latter geniculate, and seeds with prominent chalaza, in addition to occurring predominantly in the Atlantic Forest. However, this generic adscription had been already elucidated in previous studies based on part of the specimens cited by the authors. Specimens of *Turnera ibateguara* have been studied by Zelenski et al. (2016) and referred to *T. pernambucensis*, a name recently combined in *Oxossia* (i.e., *O. pernambucensis*) by Rocha et al. (2019), on the basis of extensive morphological and DNA data. Costa-Lima and Chagas (2019) showed the equivalence

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between specimens of *T. acangatinga* and *T. annularis* var. *conglomerata*, but this variety is already a synonym of *O. annularis* (Urb.) L. Rocha (Rocha et al., 2019).

Turnera acangatinga has notable overlaps with *Oxossia annularis*, and characters indicated as diagnostic of *T. ibateguara* overlap with *O. pernambucensis*. Publishing new names associated with species that have extensive overlap with others, without previous population-genetics

work assessing the limits between the species, may result in the unnecessary publication of new species (e.g., Jalal et al., 2014; Moonlight and Jara-Muñoz, 2017; Sotuyo et al., 2017; Tucker and Gandhi, 2019; Tebbitt et al., 2020). Following this argument, *T. acangatinga* and *T. ibateguara* may also be the result of this variation and should be considered synonyms for *O. annularis* and *O. pernambucensis*, respectively.

TURNERA ACANGATINGA: A NEW SYNONYM FOR OXOSSIA ANNULARIS

Oxossia annularis has petioles ranging from 2 to 10 mm long, overlapping the measurement of those of *T. acangatinga*, 3–8 mm long; the indumentum in the former may be hirsute or pilose in the adult branches, and the leaves may be rigid (dry or fresh) (see Rocha and Rapini, 2015), similar to *T. acangatinga*. Like *T. acangatinga*, the leaf blade of *O. annularis* can be elliptical, ovate, or obovate, and have serrate-crenate margins and wide teeth (Arbo, 2000, fig. 1C; Rocha and Rapini, 2015). *Turnera acangatinga* also overlaps with *O. annularis* in several structural shapes and dimensions (see Rocha and Rapini, 2015), casting doubt on its new species status. Referring to the two varieties of *O. annularis* (written as *T. annularis*), Costa-Lima and Chagas (2019: 840) mention, “However, in some cases we find overlapping characters in the specimens listed by Urban (1883) of both varieties.” Nevertheless, just below that statement they indicate, “It is likely that *T. annularis* var. *conglomerata* corresponds to the same species that we are describing here,” that is, *T. acangatinga*. These comments show once again that the uncertainty of this new name was

already known to the authors. Therefore, the characters adopted by the authors can certainly be considered variations within the same species, *O. annularis*.

***Oxossia annularis* (Urb.) L. Rocha, Molec. Phylogen. Evol. 137: 59. 2019.**

Basionym: *Turnera annularis* Urb. var. α , Jahrb. Königl. Bot. Gart. Berlin 2: 124. 1883. TYPE: BRAZIL. Rio de Janeiro, Jurujuba, près de la mer, fl jaunes, 19 Oct. 1873, A. Glaziou 6812 (Lectotype, designated by Arbo, 2000: P [P00715474]; Isolectotypes: C, K [K000373173], K [K000373172], P [P00715475], P [P00715476], B [destroyed], F [FOBN013565]).

Heterotypic synonym: *Turnera acangatinga* Costa-Lima & E.C.O. Chagas, Syst. Bot. 44(4): 838. 2019. *syn. nov.* TYPE: BRAZIL. Alagoas, Mun. Boca da Mata, Fazenda Daniel, 28 Mar. 2009, Chagas-Mota, E. Gonçalves & N. Ramos 2454 (Holotype: MAC [MAC0037739]).

TURNERA IBATEGUARA: A NEW SYNONYM FOR OXOSSIA PERNAMBUCENSIS

Contrary to what was pointed out by Costa-Lima and Chagas (2019), in *Oxossia pernambucensis* (as *Turnera pernambucensis*) the leaves are not always concentrated at the apex of the branches, and neither do plants of *T. ibateguara*. In both species, the branches and leaves may have an indumentum ranging from strigose to sparse-strigose to glabrescent (Arbo, 2000; Zelenski et al., 2016). Species of the genus *Oxossia* can also vary widely in the arrangement of the branches; this is evident in *O. maracasana* and *O. calyptrocarpa*, which can be very branched shrubs or not. Leaf blade shape also does not seem to be a useful differentiating character, because *T. ibateguara* may have lanceolate leaves with short petioles (ca. 1 mm long) (Zelenski et al., 2016, fig. 1A), as described in *O. pernambucensis* (Arbo 2000). Unlike what was mentioned in Costa-Lima and Chagas (2019), *T. ibateguara* has terminal or axillary inflorescences and fruits without appendages, two features common in *O. pernambucensis*.

Consequently, *T. ibateguara* should be also synonymized under *O. pernambucensis*.

***Oxossia pernambucensis* (Urb.) L. Rocha, Molec. Phylogen. Evol. 137: 59. 2019.**

Basionym: *Turnera pernambucensis* Urb., Jahrb. Königl. Bot. Gart. Berlin 2: 133. 1883. TYPE: BRAZIL. Pernambuco: Catucá (aprox. 48 km a W de Recife), shady woods, Nov. 1837, G. Gardner 1154 (Lectotype, designated by Arbo, 2000): K [K000373158]; Isolectotypes: K [K000373157], B [destroyed], F [FOBN013596]).

Heterotypic synonym: *Turnera ibateguara* Costa-Lima & E.C.O. Chagas, Syst. Bot. 44(4): 840. 2019. *syn. nov.* TYPE: BRAZIL. Alagoas: Mun. Iateguara, Coimbra, Grota da Burra, 29 Mar. 2011, Chagas-Mota 10666 (Holotype: MAC [MAC0052576]; Isotypes: CTES not located, HUEFS not located, IPA not located, UFRN not located, W not located).

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