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Original Paper

Disentangling *Cuscuta* identification in Brazil: a first taxonomic contribution to the northeast region species

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Abstract

Cuscuta is a genus of Convolvulaceae distributed worldwide and comprises about 200 species, of which 26 were reported to Brazil. They are characterized by being holoparasites, leafless, gamopetalous, bisexual and usually pentamerous flowers. Studies available for South American *Cuscuta* are mostly from late XIX and early XX centuries. The restriction of taxonomic bibliographies, together with the fact that taxonomic informative characters are restricted to their tiny flowers, make the species identification a challenge. In this context, this work aimed to study the diversity of *Cuscuta* for the northeast region of Brazil and allow species identification. Field works were carried out in all northeast region states and about 150 specimens from 17 herbarium collections were analyzed. A lectotypification is proposed for *C. racemosa*. *Cuscuta orbiculata*, cited to Mexico, Guatemala and Brazil (Goiás and northeast region), is synonymized under *C. tinctoria*. Eight species were recognized, occurring mainly in areas of Caatinga, that predominates in the region. Descriptions, taxonomic comments, illustrations and an identification key are presented.

Key words: dodders, floristic, Holoparasites, parasitic plants.

Resumo

Cuscuta é um gênero de Convolvulaceae que apresenta distribuição cosmopolita e compreende cerca de 200 espécies, das quais 26 são reportadas para o Brasil. Caracterizam-se por serem holoparasitas, áfilas, com flores gamopétalas, bissexuais e, geralmente, pentâmeras. Os estudos para *Cuscuta* da América do Sul são, em sua maioria, do final do século XIX e início do XX. A restrição de bibliografias taxonômicas para o gênero, somado ao fato dos caracteres informativos estarem restritos às suas flores diminutas, tornam a identificação das espécies um desafio. Neste contexto, este trabalho objetivou estudar a diversidade de *Cuscuta* para a região Nordeste do Brasil e permitir a identificação das espécies, expandindo o conhecimento numa escala regional e nacional. Foram realizadas expedições de coleta em todos os estados do Nordeste, e analisados cerca de 200 espécimes das coleções de 17 herbários. É proposta a lectotipificação de *C. racemosa* e a sinonimização de *C. orbiculata*, citada para o México, Guatemala e Brasil (Goiás e região Nordeste), sob *C. tinctoria*. São reconhecidas oito espécies, ocorrendo principalmente em áreas de Caatinga, que predominam na região. São apresentadas descrições, comentários taxonômicos, ilustrações e uma chave de identificação.

Palavras-chave: cipó-chumbo, florística, Holoparasitas, plantas parasitas.

Introduction

Cuscuta L. (1753a: 124) is represented by leafless plants, with haustoria, aclorophyllate, non-photosynthetic and therefore, these individuals suck the elaborate sap of a host plant (Andrade *et al.* 2007). It comprises about 200 species, and according with BFG (2018) 26 species were recognized, of which 11 were recorded in the northeast region. About 15 to 20 species of *Cuscuta* are pests that can cause up to 80% yield losses in plants cultivated, ornamental and wild plants (Pereira 1998) preventing healthy growth of the host species.

See supplementary material at <https://doi.org/10.6084/m9.figshare.14669889.v1>

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In addition of being an economic concern, as parasitic weeds, some species also stand out by its medicinal and ecological importance. Popular recommendations for treatment of urinary disorders, icterus, muscular pain, cough, biliary disorders, as purgative also for itchy skin are found in literature (Wright *et al.* 2011; Khan *et al.* 2010). Ecologically, because of their parasitic condition, they can compromise the development of the host plant, possibly generating changes in the competitive interactions and influencing the community structure, observed diversity, nutrient cycling and vegetation zoning (Pennings & Callaway 2002).

The taxonomic position of *Cuscuta* in a historical perspective has been largely discussed, with disagreement about its belonging either to Convolvulaceae (Jussieu 1789; Choisy 1841; Engelmann 1842, 1859; Engler & Gilg 1924) or to a monogeneric family, Cuscutaceae (Cronquist 1981; Pfeiffer 1845; Progel 1869; Austin 1998). This discordance is because *Cuscuta* is quite distinct from other Convolvulaceae, for being holoparasites, with leaves reduced to scales and calyx usually gamosepalous (*vs.* photosynthetic plants, foliolated and calyx dialisepalous), although remnant flower morphology is mostly congruent. The most recent phylogenetic hypothesis indicated the monophyly of Convolvulaceae only with the inclusion of *Cuscuta*, despite its position within the family has not been completely elucidated (Stefanović *et al.* 2003; Stefanović & Olmstead 2004).

The last comprehensive taxonomic treatment of the genus was carried out in 1932 by Yuncker, for the American species. Despite its importance, this treatment is sometimes hard to use, since the identification key starts with fruit characters - frequently missing in herbarium material - and also species descriptions are not comparable to each other since they have different formats. Besides that, the infrageneric classification proposed by Yuncker was considered unnatural by recent phylogenetic studies (Costea *et al.* 2015), indicating that more in depth studies are needed.

The lack of recent taxonomic literature together with informative characters restricted to its small flowers, led to severe difficulty to identify taxa. Most of the available literature that that includes *Cuscuta* species in Brazil deals with the consequences of the parasitic relationship to the host plants, or are references in local floras (Simão-Bianchini & Pirani 1997; Andrade *et al.* 2007; Alves & Kolbek 2009; Simão-Bianchini *et al.* 2016), and more rarely new species descriptions, as *Cuscuta taimensis* P.P.A. Ferreira & Dettke (Ferreira *et al.* 2014). The present study aimed to evaluate the diversity of *Cuscuta* in northeast region of Brazil, providing tools to the correct identification of species.

Material and Methods

This study was carried out in the northeast region of Brazil (Fig. 1), which is composed by nine states: Alagoas (AL), Bahia (BA), Ceará (CE), Maranhão (MA), Paraíba (PB), Pernambuco (PE), Piauí (PI), Rio Grande do Norte (RN) and Sergipe (SE). It comprises an area of 1.561.177,8 km^2 (18,3% of Brazilian territory) and is limited by the Atlantic ocean to the east and north, by the states of Espírito Santo and Minas Gerais to the south and by the states of Pará, Tocantins and Goiás to the west (SUDENE 2015). Caatinga is the predominant phytogeographic domain, occupying more than 50% of all states. In this region, other phytogeographic domains such Amazonia (in a small portion of Maranhão state), Cerrado and the Atlantic Forest are also found (IBGE 2017).

Initially, a literature survey together with consultation of collections available online were carried out to determine species occurring in the study area, in addition to identifying priority areas for fieldwork. Collections of 17 herbaria were consulted (ALCB, CEPEC, EAC, HRB, HST, HUEFS, HUFRN, HVASF, IPA, JPB, MAC, MBM, MOSS, PEUFR, RB, SPF and UFP) (acronyms according to Thiers, continuously updated), resulting in about 150 specimens analyzed; whenever was possible identifications were updated. Specimens identification were made

Figure 1 – Brazil's northeast region political delimitation.

by comparison with species previously identified by experts, type material available online, Digital Atlas of *Cuscuta* (Costea 2007-onwards) and by using specialized literature (Progel 1869; Yuncker 1921, 1922, 1923, 1932).

Field work have been carried out by the Laboratory of Integrative Systematics of Angiosperms team (LASIA-UFRPE) focusing on Convolvulaceae since 2015. Expeditions were carried out in all northeast region states of Brazil. Specimens collected were processed and deposited in PEUFR herbaria according to the usual botanical material management techniques (Mori *et al*. 1985). Duplicates were sent to JPB, ALCB and K. A database was compiled containing information available about all vouchers studied (Tab. S1, available on supplementary material <https://doi.org/10.6084/m9.figshare.14669889.v1).

The terminology used followed Harris & Harris (2001) and Yuncker (1932) and measurements were made using the ImageJ© software (Schneider *et al.* 2012; Rasband 1997-2018) calibrated in centimeters. An identification key was elaborated accompanied by detailed morphological descriptions, taxonomical comments and geographical distribution. Diagnostic characters were illustrated, and distribution maps were constructed using DIVA-GIS© 7.5 software (Hijmans *et al.* 2012).

Results and Discussion

Despite all effort employed in field trips, only 15 specimens of five different species were found (Fig. 2) (*Cuscuta americana* L. (1753a: 124), *C. racemosa* Mart. (1823: 286), *C. globosa* Ridl. (1890: 48), *C. partita* Choisy (1841: 284) and *C. tinctoria* Mart. *ex* Engelm. (1859: 480-481)), which indicate the rarity of this group in the NE Brazil. Some species showed preferences for humid habitat such as *C. americana*, while others for shaded environments such as *C. globosa*.

A total of eight species of *Cuscuta* are listed occurring in the NE Brazil, in discordance with the 11 species indicated in BFG (2018); no records for *Cuscuta indecora* Choisy (1841: 278-279) and *Cuscuta insquamata* Yunck. (1923: 12) were found. A specimen identified in herbaria as *C. indecora* (Mendes *et al.* 548, UB) is actually *C. partita*. However, considering that fruit may present a late dehiscence in *C. partita*, to observe this character is sometimes challenging. Other morphological difference between these two species are the corolla papillate and calyx smooth in *C. partita*, while *C. indecora* has both the calyx and corolla papillate.

Cuscuta insquamata was indicated for Brazil only by one record from Abaíra, Bahia state. This specimen (Stannard *et al.* 51588, NY) could not be seen. *Cuscuta insquamata* presents flowers with less than 2 mm long, with calyx and corolla lobes acute and 4-divided. Two specimens from Bahia (ALCB 3456 e ALCB 9900) that present similar size and shape of the lobes, but are 5-divided and with ovary and infrastaminal scales still in early stages of development were observed. Comparing with floral buds of *C. partita* specimens, since it also presents calyx and corolla lobes acute and 5-divided, we noted that these buds are quite similar to the ALCB samples. Thus, since only one record of *C. insquamata* is cited and it could not be checked, this species is not included in this treatment. *Cuscuta insquamata* is considered here as occurring only in Bolivia (Yuncker 1932), therefore.

Identification key of *Cuscuta* species occurring in Brazilian northeast region

1. Calyx lobes with acuminate to acute apex 2
   2. Inflorescence glomeruliform, many flowered (> 20); fruit indehiscent, only partially involved by the persistent corolla ..... 4. *Cuscuta globosa*
   2’. Inflorescence dichasial or umbeliform, up to 10 flowers; fruit dehiscent, completely involved by the persistent corolla 3
      3. Calyx with lobes overlapping at base (imbricate), erect, not reflexed; corolla smooth; fruit opaque ..... 8. *Cuscuta umbellata*
      3’. Calyx with lobes not overlapping, often reflexed; corolla papillate; fruit translucent ..... 5. *Cuscuta partita*
1’. Calyx lobes with obtuse to rounded apex 4
   4. Bracts with obtuse to rounded apex; flowers spherical (as long as wide or wider) 5

5. Flowers > 5 mm long; calyx urceolate, with completely overlapping lobes; corolla lobes with a rounded apex ..... 7. *Cuscuta tinctoria*
5'. Flowers < 3 mm long; calyx funnelform, lobes overlapping only at base; corolla lobes with an acute apex..... 2. *Cuscuta corniculata*

4'. Bracts with acute to subacute apex; flowers cylindrical to funnelform (longer than wide)..... 6
6. Calyx much shorter than the corolla tube, reaching approx. half of the tube; corolla campanulate ..... 6. *Cuscuta racemosa*
6'. Calyx as long or almost as long as corolla tube; corolla cylindrical to urceolate..... 7
7. Infrastaminal scales with bridge ca. or more (1–2 mm long) of the scale length (2–3 mm long) ..... 1. *Cuscuta americana*
7'. Infrastaminal scales with bridge measuring ca. 1/3 or less (0.3–0.6 mm long) of the scale length (2.5–5 mm long)..... 3. *Cuscuta corymbosa* var. *grandiflora*

Taxonomic treatment

Cuscuta L. Sp. Pl. 1: 124. 1753.

Branchlets 0.05–1.7 mm diam., green, orange or yellow. Inflorescence cyme, cyme umbelform, glomeruliform, dichasial or dichasial compound; bractes ovate, rhomboid, rotund, lanceolate, oblanceolate or deltoid; bracteoles absente or, when present, obovate. Bissexual flowers, with radial symmetry, sessiles or pedicelate, pentamerous, white or light-yellow. Pedicels and perianth with or without papillae. Calyx fused at least in the base, cylindrical, campanulate or funnelform, sometimes angled, lobes rounded to lanceolate, overlapping or not (Fig. 3a,b). Corolla gamopetalous, campanulate to cylindrical, lobes erect, inflexed or reflexed, always erect on buds Anthers ellipsoid with longitudinal aperture, ca. 0.5 mm, yellow-light to yellow; stamens alternate with the corolla lobes; infrastaminal scales present (Fig. 3c) alternate with corolla lobes, adhered to corolla tube similar to a corona, very variable in shape, size and ramification (Fig. 3d). Ovary superous, globose, two locules with two ovules per locule. Stigmas capitate. Capsule indehiscent (Fig. 3e) or dehiscent opened by a circumcision on the base (Fig. 3f), completely (Fig. 3g) or partially (Fig. 3h) enclosed by the persistent corolla. One to four seeds with ca. 1 mm.

1. *Cuscuta americana* L. Sp. Pl. 1: 124 1753. Lectotype, designated by Engelmman 1859, LINN 170.5!. Figs. 2a-b; 4a-f; 6a

Branches ca. 1.5 mm diam., orange. Inflorescence glomeruliform, flowers 7-many; pedicels absent to 1.5 mm long; bracts ca. 1.3 × 1 mm, ovate to rhomboid, apex subacute, margin entire; bracteoles absent. Flowers cylindrical to funnelform, 2–4 × 1.5–2 mm, green when fresh and brown or yellow when dried, 5-merous. Calyx green, cylindrical to campanulate, 2–3.5 × 1.5–2 mm, as long as the corolla tube, tube 1.5–2.5 mm long, equal lobes, ca. 0.5 × 1 mm, overlapping at base, apex obtuse, erect, margin entire, smooth. Corolla white to light yellow, cylindrical, tube 2–3.5 mm long, lobes 0.2–0.5 × 0.5 mm, ca. 1/4 of the corolla size, obtuse to rounded, inflexed with apex straight or inflexed, margin entire. Stamens included, as long as the corolla tube; anthers ca. 0.5 mm long, filaments 1.8–3 mm long. Infrastaminal scales 2–3 mm long, as long as the corolla tube, obovate, apex acute to rounded, rare bifurcate, bridge 1–2 mm long; fimbriae of light to dense density, ca. 0.2 mm long. Carpel 2–3 mm long, included; styles cylindrical ca. 0.1 mm diam.; stigma globose, 0.1–0.2 mm long. Fruit opened by circumcision, globose to ovoid, ca. 1.5 × 1.3 mm, intrastylar opening present, opaque, completely involved by the persistent corolla. Seeds 1–2, ca. 1 mm long.

Examined material: ALAGOAS: Água Branca, REVIS do Craunã e do Padre, Morro do Craunã, 09°26'08"W, 37°93'61"S, 22.VII.2014, fl. and fr., *M.W. Tavares-Silva 96* (MAC). BAHIA: Amélia Rodriguez, 4 km SE de Amélia Rodrigues, 20.III.1987, fl. and fr., *L.P. de Queiroz 1459* (HUEFS). Conceição de Feira, V.1980, fl. and fr., *Grupo Pedra do Cavalo 9* (ALCB, CEPEC, HRB, HUEFS). Feira de Santana, 8.VII.1982, fl. and fr., *K.B. Brito 61* (ALCB, HUEFS); VIII.1980, fl. and fr., *Grupo Pedra do Cavalo 564* (ALCB, CEPEC, HRB, HUEFS). Glória, 5.VI.2004, fl. and fr., *M.V.M. Oliveira 687* (HUEFS). Ipuaçu, XI.1980, fl. and fr., *Grupo Pedra do Cavalo 938* (HUEFS). Jacobina, 11°16'S, 40°27'W, 25.VIII.1980, fl. and fr., *R.P. Orlandi 254* (ALCB, HRB). CEARÁ: Aurora, Serra do Vaqueiro Ademar, cume da Serra, 11.IX.2014, fl. and fr., *A.P. Fontana 8522* (HUEFS). Baixio, estrada vicinal entre Baixio-CE e Santa Helena-PB, trecho 5 Ramal IV do Eixo Norte (PB-RN), 21.V.2014, fl. and fr., *J.L. Costa-Lima 1287* (HUEFS). Mauriti, São

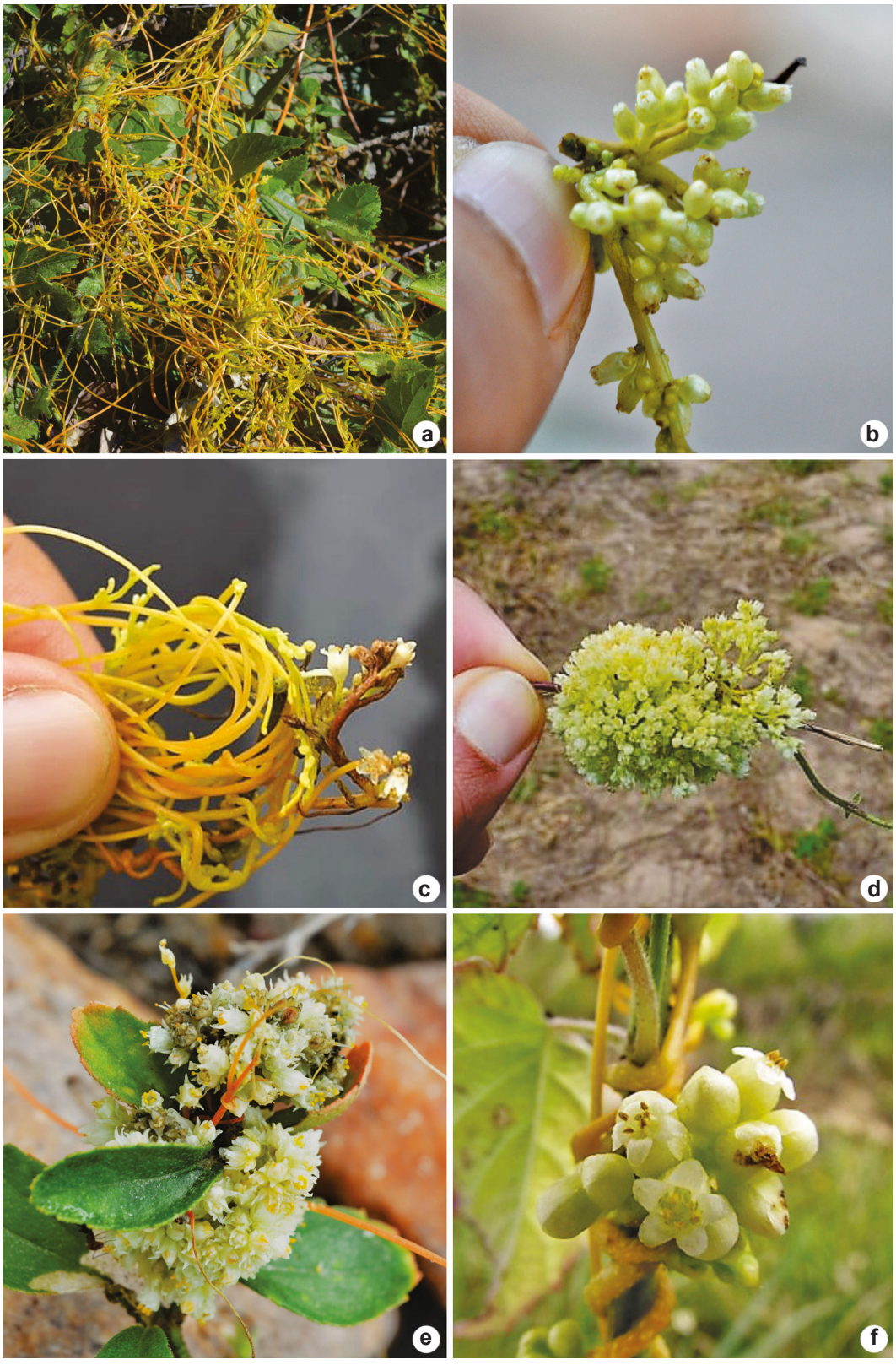

Figure 2 – a-f. Species sampled – a-b. *Cuscuta americana* – a. habit; b. inflorescence; c. *Cuscuta racemosa*; d. *Cuscuta globosa*; e. *Cuscuta partita*; f. *Cuscuta tinctoria*.

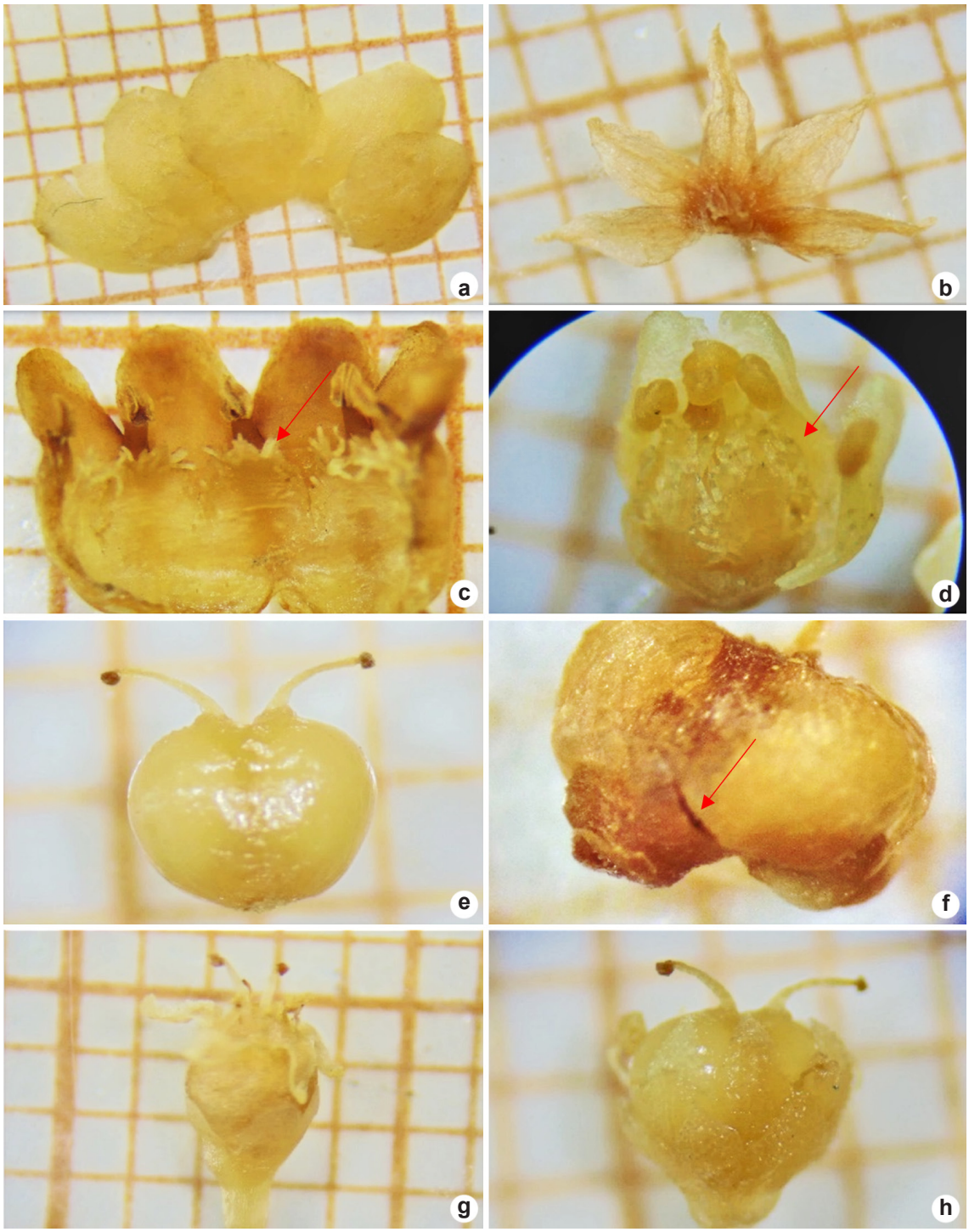

Figure 3 – a-h. Taxonomically useful morphological characters in the specific determination of *Cuscuta* – a. calyx overlapped in *Cuscuta tinctoria*; b. calyx not overlapped in *Cuscuta partita*; c. infrastaminal scales in *Cuscuta tinctoria*; d. infrastaminal scales similar to a corona in *Cuscuta corniculata*; e. capsule indehiscent in *Cuscuta globosa*; f. capsule dehiscent by circumcision on the base in *Cuscuta partita*; g. capsule completely enclosed by the persistent corolla in *Cuscuta racemosa*; h. capsule partially enclosed by the persistent corolla in *Cuscuta globosa*. (a, c. *S.C. Nepomuceno 43*; b, f. *J.A.A.M. Lourenço et al. 110*; d. *J.N. Tabosa* IPA-52533; e, h. *S.C. Nepomuceno 42*; g. *S.C. Nepomuceno 60*).

Miguel, início do túnel Cuncas I, Lote 6, 07°35'50.9"S, 38°48'25.6"W, 21.VII.2010, fl., *A.P. Fontana et al. 7029* (HVASF, PEUFR). PARAÍBA: Cajazeiras, Sítio Catolé, 06°50'23.5''S, 38°29'55.7''W, 293 m, 3.VI.2013, fl., *A.C.P. Oliveira et al. 2538* (HVASF). São José de Piranhas, reservatório Cuncas, 07°06'41.1''S, 38°36'34.4''W, 382 m, 1.VIII.2012, fl. and fr., *N.M. Almeida 159* (HVASF). PERNAMBUCO: Fernando de Noronha, Ilha de São José, 21.X.2003, fl. and fr., *A.M. Miranda 4235* (HUEFS, RB). Floresta, centro da cidade, 08°36'16.94"S, 39°34'15.90"W, 14.IV.2017, fl. and fr., *S.C. Nepomuceno 15* (PEUFR). Buíque, entrada para o Vale do Catimbau, 08°34'35"S, 37°14'46.4"W, 15.VIII.2017, fl. and fr., *S.C. Nepomuceno 26* (PEUFR). PIAUÍ: Caracol, Parque Nacional da Serra das Confusões, 09°12'47.8"S, 43°29'56.6"W, 9.XII.2011, fl. and fr., *J.A. Siqueira-Filho et al 2656* (HVASF). RIO GRANDE DO NORTE: Florânia, Rodovia para Tenente Laurentino ca. 6 km da sede do município Serra de Santa., 06°07'44"S, 36°45'23″W, 29.V.2010, fl. and fr., *J.G. Jardim 5784* (HUFRN).

There are records of *C. americana* from the United States to northern Argentina (Austin 1982). In Brazil is widely distributed in northeast region, Midwestern (Mato Grosso and Goiás) and Southeastern regions (Minas Gerais) (BFG 2018). New records for Alagoas, Piauí and Rio Grande do Norte are here presented. It is often found in humid environments.

Yuncker (1932) indicates in his keys, illustrations and descriptions that this species is closely related to *Cuscuta globulosa* Benth. (1844: 138). He indicate that it could be distinguished by the following set of characters, many of them overlapping: *C. globulosa* has larger flowers (3–4 mm long), yellow when dried, inflorescence less dense, capsules depressed-globose with two seeds and infrastaminal scales more fringed and with lower bridge, while *C. americana* has smaller flowers (2–3 mm long), brownish when dried, inflorescence more dense, capsules ovoid with one seed and infrastaminal scales less fringed and with higher bridge.

Phylogenetic studies in which *C. globulosa* and *C. americana* samples were included, shows *C. globulosa* together with *Cuscuta cozumeliensis* Yunck. (1922: 108), and *Cuscuta macrocephala* Yunck. (1921: 126), appearing as sister of *C. americana* with high support (Stefanović *et al.* 2007). Thus, considering that characters used by Yuncker (1932) does not seem consistent enough to differentiate these species, and phylogenetic studies show them as closely related, further morphological or population level investigations are recommended to improve specific delimitation.

Despite the overlapping characters, specimens are here identified as *C. americana* due to predominant characteristics and wider distribution, considering that *C. globulosa* seems to be more common throughout West India and Mexico and is not cited for South America (Yuncker 1932). In NE Brazil, is similar to *Cuscuta corymbosa* var. *grandiflora* Engelm. (1859: 483) because it presents similar calyx but can be distinguished by infrastaminal scales with bridge measuring ca. 1/2 or more of the total scale size in *C. americana*, and bridge measuring ca. 1/3 or less of the total scale size in *C. corymbosa* var. *grandiflora*.

Flowering from May to December.

2. *Cuscuta corniculata* Engelm. Trans. Acad. Sci. St. Louis. 1(3): 504. 1859. Type: VENEZUELA. Rio Meta: *H. Karsten s.n.* (holotype K 000196076!).

Figs. 4g-k; 6b

Branches ca. 0.4 mm diam., yellow. Inflorescence a cyme, flowers 3–9; pedicels 1.3–1.5 mm long; bracts ca. 1.3 × 1 mm, rotund, apex rounded, margin entire; bracteoles absent. Flowers spherical, 2–3 × 2–3 mm, yellow when dried, 5-merous. Calyx funnelform, ca. 1.5 × 2.1 mm, as long as the corolla tube, tube ca. 0.4 mm long, lobes equal, 0.9 × 1.1 mm, overlapping at base, apex rounded, erect, margin entire, smooth. Corolla urceolate, tube ca. 1.5 mm long, lobes ca. 1 × 0.8 mm, ca. 1/2 of the corolla size, acute, straight or reflexed with apex inflexed, margin entire. Stamens included, longer than the corolla tube; anthers ca. 0.5 mm long, filament ca. 1.1 mm long. Infrastaminal scales ca. 1.5 mm long, as long as the corolla tube, rotund, apex rounded, bridge ca. 0.6 mm long; fimbriae of moderate density, 0.2 mm long. Carpel ca. 1.3 mm long, included; styles cylindrical ca. 0.1 mm diam.; stigma globose, 0.1–0.2 mm long. Fruit opened by circumcision, depressed-globose, 0.7–1.1 × 1.5–2.1 mm, intrastylar opening present, translucent, partially involved by the persistent corolla. Seeds 3–4, 0.7–1.1 mm long.

Examined material: BAHIA: Piatã, Gerais da Inúbia 22-26 km de Catolés, 10.III.1992, fl. and fr., *B. Stannard et al. 51861* (SPF). PERNAMBUCO: Belém de São Francisco, 5.IX.1990, fl. and fr., *J.N. Tabosa IPA-52533* (IPA). Brejo da Madre de Deus, fr., *IPA-55343* (IPA).

Occurs in Brazil, Venezuela and Colombia (Yuncker 1932). Registered to Brazil in Bahia, Goiás, Rio de Janeiro, Santa Catarina and Rio Grande do Sul (BFG 2018), with this study it was verified its occurrence also in Pernambuco

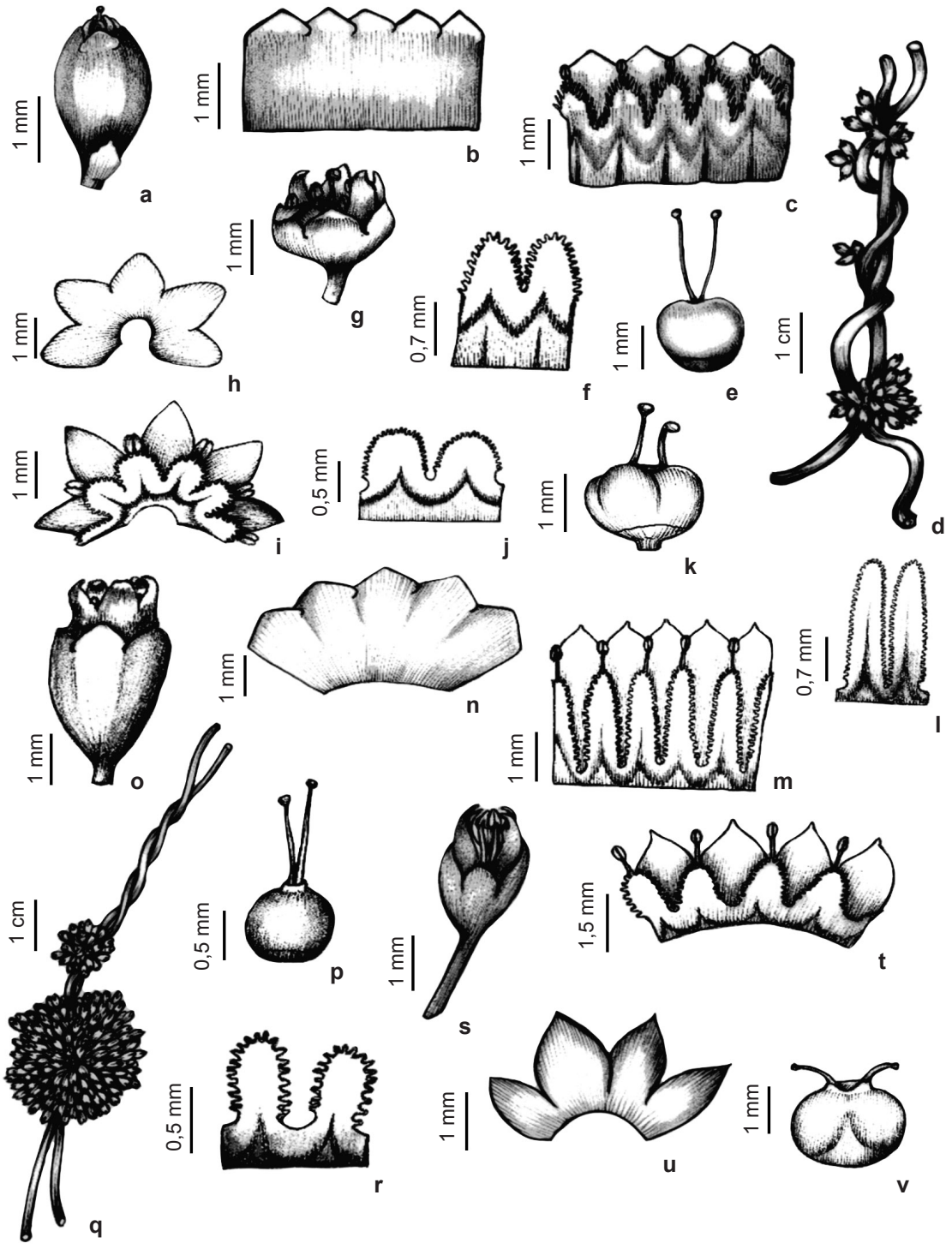

Figure 4 – a-f. *Cuscuta americana* – a. flower; b. calyx; c. corolla with infrastaminal scales; d. habit; e. fruit; f. infrastaminal scales. g-k. *Cuscuta corniculata* – g. flower; h. calyx; i. corolla with infrastaminal scales; j. infrastaminal scales; k. fruit. l-p. *Cuscuta corymbosa* var. *grandiflora* – l. infrastaminal scales; m. corolla with infrastaminal scales; n. calyx; o. flower; p. fruit. q-v. *Cuscuta globosa* – q. habit; r. infrastaminal scales; s. flower; t. corolla with infrastaminal scales; u. calyx; v. fruit. (a-f. *S.C. Nepomuceno 15*; g-k. *J.N. Tabosa* IPA-52533; l-p. *A. Fernandes* EAC-12778; q-v. *S.C. Nepomuceno 42*).

state. Even though it was not found in the field, herbarium labels indicated the occurrence of the species in irrigated areas.

It resembles *C. tinctoria* by its spherical flowers but can be distinguish by the flowers ca. 6 mm long, bracteoles present, calyx lobes completely overlapped and corolla lobes rounded in *C. tinctoria vs.* flowers ca. 2 mm long, bracteoles absent, calyx lobes slightly overlapping and corolla lobes acute in *C. corniculata.*

Flowering in November.

3. *Cuscuta corymbosa* var. *grandiflora* Engelm. Trans. Acad. Sci. St. Louis 1: 483. 1859. *Cuscuta popayanensis* Kunth Nov. Gen. Sp. 3: 123. 1818.

Type: COLOMBIA. Popayan: *K.T. Hartweg 1237* (holotype P 622284!; isotype E 388772!).

Figs. 4l-p; 6c

Branches ca. 1 mm diam., yellow. Inflorescence dichasial, flowers sessiles 7–9; pedicels absent to 3 mm long; bracts ca. 1 × 0.5 mm, lanceolate, apex acute, margin entire; bracteoles absent. Flowers funnelform, 4.2–6.7 × 2–4 mm, yellow when fresh and dried, 5-merous. Calyx funnelform, 3–5 × 2–4 mm, almost as long as the corolla tube, tube 2–4 mm long, lobes equal, 0.5–1 × 1.2–1.5 mm, overlapping at base, apex obtuse, erect, margin entire, smooth. Corolla cylindrical to urceolate, tube 3.5–5.5 mm long, lobes 1.2–1.5 × 1–1.5 mm, ca. 1/4 of corolla size, acuminate, inflexed with apex straight or inflexed, margin entire. Stamens included, as long as the corolla tube; anthers ca. 0.5 mm long, filament 1–1.5 mm long. Infrastaminal scales 2.5–5 mm long, shorter than corolla tube, elliptic, apex rounded, bridge 0.3–0.6 mm long; fimbriae of light density, 0.05–0.2 mm long. Carpel 3–6 mm long, included; styles slightly conical 0.1–0.5 mm diam.; stigma globose, ca. 0.3 mm long. Fruit opened by circumcision, globose, 2.5–3.5 × 2–3.5 mm, intrastylar opening present, translucent, completely involved by the persistent corolla. Seeds 1–2, ca. 2 mm long.

Examined material: CEARÁ: Itatira, Serra do Céu, 3.VIII.1984, fl. and fr., *A. Fernandes et al* (EAC12778).

Cuscuta corymbosa var. *grandiflora* is recorded from Mexico to Ecuador (Austin 1982; Breedlove 1986), and for Brazil was considered as endemic to Fernando de Noronha island (BFG 2018). No specimens from the island was here confirmed as this variety, but with our investigation was possible to confirm a single occurrence from Serra do Céu, Itatira-CE, in the year 1984, without more accurate information about its location.

This variety differs from the typical one, which was not found in the study area, by its larger flowers (ca. 5 mm long *vs.*4mm in typical), calyx with more than half corolla tube (*vs.* reaching the middle of the corolla tube) and subsessile stamens (*vs.* sessile stamens). In NE Brazil, *C. corymbosa* var. *grandiflora* can be confused with *C. americana* for presenting similar calyx, but differ in the features identified in *C. americana* comments.

Flowering in August.

4. *Cuscuta globosa* Ridl. J. Linn. Soc., Bot. 27: 48. 1890. Type: BRAZIL. Fernando de Noronha: *H.N. Ridley 72* (holotype K 000196099!).

Figs. 4q-v; 6d

Branches ca. 0.6 mm diam., green. Inflorescence glomeruliform, more than 20 flowers; pedicel 1.5–3 mm long; bracts ca. 1.7 × 0.7 mm, lanceolate, apex acute, margin entire; bracteoles absent. Flowers ovoid to spherical, ca. 2.6 × 1.7 mm, green when fresh and yellow when dried, (4–)5-merous. Calyx green, campanulate, ca. 1.5 × 2 mm, longer, rare as long as the corolla tube, tube ca. 0.4 mm long, lobes unequal, the longest four 1.1 × 1.1 mm, the shorter 0.7 × 0.4 mm long, absent when 4-merous, not overlapped, apex acute, erect, margin serrated due to the presence of papillae. Corolla white, ovoid, tube ca. 1 mm long, lobes ca. 0.9 × 0.8 mm, ca. 1/2 of the corolla size, acute, straight with apex straight or inflexed, margin serrated due to the presence of papillae. Stamens included, longer than corolla tube; anthers ca. 0.4 mm long, filament ca. 1.2 mm long. Infrastaminal scales ca. 1 mm long, longer than corolla tube, oblong, apex rounded, bridge ca. 0.3 mm long; fimbriae of moderate density, 0.1 mm long. Carpel ca. 2 mm long, included; styles cylindrical ca. 0.1 mm diam.; stigma globose, ca. 0.1 mm long. Fruit indehiscent, globose to depressed-globose, ca. 1.6 × 2 mm, intrastylar opening present, translucent, partially involved by the persistent corolla. Seeds 2–3, ca. 1.5 mm long.

Examined material: ALAGOAS: Maceió, Farol, próximo ao batalhão do Exército, 16.I.2008, fl. and fr., *Chagas-Mota 252* (MAC). BAHIA: Campo Alegre de Lourdes, 26.V.2002, fl. and fr., *A.M. Miranda 3908* (HST); Conceição de Feira, mata a NE de Bananeiras, vale dos rios Paraguaçu e Jacuípe, 12°32'W, 39°05'S, IX.1980, fl. and fr., *Grupo Pedra do Cavalo 766* (ALCB, HBR, HUEFS). Feira de Santana, Ipuaçu, 12°15'W, 38°58'S, 2.XII.2003, fl. and fr., *J.G. Carvalho-Sobrinho et al. 157* (HUEFS). CEARÁ: Mauriti, lote

VI, 30.VI.2009, fl. and fr., *J.R. Maciel 1269* (HVASF). PARAÍBA: São José de Piranhas, reservatório Morros, 07°09'09.35"W, 38°26'21.73"S, 393 m, 19.V.2011, fl. and fr., *F.F.S. Silva 454* (HVASF). PERNAMBUCO: Águas Belas, 17.XI.1999, fl. and fr., *V.C. Lima et al. IPA-65560* (IPA). Arcoverde, Estação Experimental do IPA, 21.VII.1971, fl. and fr., *D. Andrade-Lima 71-6321* (IPA). Carpina, entrada de Carpina, 26.XI.1952, fl. and fr., *D. Andrade-Lima 52-1186* (IPA). Caruaru, Estação Experimental do IPA, 08°14'13"S, 35°55'14"W, 19.IX.2017, fl. and fr., *S.C. Nepomuceno 42* (PEUFR). Fernando de Noronha, 09.XI.1980, fl. and fr., *D. Andrade-Lima 80-8895* (IPA). Recife, IX.1994, fl. and fr., *J. Braga-Filho IPA-990* (IPA). Tapera, 20.X.1927, fl. and fr., *B. Pickel 1500* (IPA). RIO GRANDE DO NORTE: Florânia, Serra de São Bento, 23.VII.2016, fl. and fr., *A.M. Marinho 307* (PEUFR).

It is endemic to northeast region of Brazil, where it occurs mainly in the states of Bahia and Pernanbuco (Yuncker 1932) in both Caatinga and Atlantic Forest areas. According to the BFG (2018) it also occurs in Alagoas, Ceará and Paraíba states. We also record it to Rio Grande do Norte and Sergipe states. *Cuscuta globosa* was usually found in shaded areas parasitizing the stem of herbs.

It is easily identified by its glomeruliform inflorescence, with flowers of ca. 2.6 mm long, with acute apex in calyx and corolla lobes. Considering species occurring in the northeast region of Brazil is the only one that can also present individuals with tetramerous flowers. Yuncker (1932) still indicates its similarities with *C. acuta* Engelm. (1859: 497) and *C. micrantha* Choisy (1841: 271) for its flowers with about 1.5 mm in length and calyx with acute lobes, and the *C. globosa* differs from these by its long pedicels, minute flowers and long stamens. In addition, *C. acuta* is endemic to Ecuador and *C. micrantha* to Chile.

Flowering from July to December.

5. *Cuscuta partita* Choisy Mém. Soc. Phys. Genève 9: 284, t. 5, f. 3. 1841[1842]. Type: BRAZIL. *J.S. Blanchet 3047* (holotype MO 2756986!).

Figs. 5a-e; 7a

Branches ca. 0.5 mm diam, orange. Inflorescence dichasial, 6–10-flowers; pedicels ca. 2 mm long; bracts 1.8 × 0.9 mm, lanceolate, apex acuminate, margin entire; bracteoles absent. Flowers ca. 2.5 × 2 mm, white to pink when fresh and reddish when dried, 5-merous. Calyx white, campanulate, ca. 1.7 × 1.6 mm, as long as the corolla tube, tube 0.3 mm long, lobes equal, 1.2 × 0.8 mm, not overlapped, apex acute to acuminate, often reflexed, margin entire, striated. Corolla white to pink, urceolate, tube 1.6 mm long, lobes 0.8 × 0.5 mm, ca. 1/3 of corolla size, acute, reflexed with apex inflexed, margin entire, papillate. Stamens exserted, longer than corolla tube; anthers ca. 0.6 mm long, filament ca. 1.8 mm long. Infrastaminal scales ca. 1.5 mm long, shorter than corolla tube, obovate, apex rounded, bridge ca. 0.4 mm long; fimbriae of moderate density, 0.1 mm long. Carpel ca. 1.8 mm long, included; styles cylindrical ca. 0.1 mm diam.; stigma globose, ca. 0.1 mm long. Fruit opened by circumcision, depressed-globose, ca. 1 × 1.5 mm, intrastylar opening present, translucent, completely involved by the persistent corolla. Seeds 2–3, ca. 0.1 mm long.

Examined material: ALAGOAS: Água branca, REVIS do Craunã e do Padre, Morro do Craunã, 30.IV.2014, fl. and fr., *A. Santos et al. 2* (MAC). BAHIA: Casa Nova, Caraíba dos Bragas, 23.III.1988, fl., *J.D.C. Arouck-Ferreira et al. 442* (MBM). Itaberaba, BR-242, 12°31'15"S, 40°08'30"W, 19.V.2015, fl. and fr., *G. Staples et al. 1645* (PEUFR). Urandi, BR-122, próximo à divisa com Ouro Branco, 4.IV.1992, fl., *G. Hatschbach 56532* (MBM). Xique-Xique, 25.VI.1996, fl., *M.L.S. Guedes 3074* (ALCB, CEPEC, HRB, HUEFS). CEARÁ: Caridade, Fazenda Feijão, 19.V.1991, fl., *P.R. Noronha EAC-18723* (EAC). Caucaia, Salgadinho, 17.VII.2006, fl., *A.S.F. Castro 1828* (EAC). Jaguaribe, Maciço do Pereiro, 10.IV.2011, fl., *A.M. Miranda 6263* (EAC, HST). São Benedito, Faz. Penha, trilha do Buraco da Velha, Planalto do Ibiapaba, 22.III.2000, fl., *E.B. Souza EAC-29910* (EAC). PIAUÍ: Piracuruca, PI-110, entre Piracuruca e BR-232, 03°58'43"S, 41°28'22"W, 11.VI.2016, fl. and fr., *J.A.A.M. Lourenço et al. 110* (PEUFR). PERNAMBUCO: Parnamirim, Sítio Olho d'água, 08°8'39"S, 39°35'48"W, 8.IV.2009, fl. and fr., *J.A. Siqueira-Filho 2013* (HVASF, PEUFR). Sagueiro, Reservatório Negreiros, 08°06'07.9"S, 39°12'14.4"W, 454 m, 10.IV.2011, fl. and fr., *F.F.S. Silva et al. 251* (HVASF). RIO GRANDE DO NORTE: Apodi, próximo ao açude da Baixa Grande, 05°21'S, 37°35'W, 70 m, 27.IV.1980, fl. and fr., *O.F. Oliveira 661*. Jucurutu, RPPN Stoessel de Britto, 1.III.2018, fl., *A.A. Roque 456* (HUFRN). Caicó, sítio pelados, próximo à Serra de São Bernardo, estrada para São José do Seridó, 14.III.2009, fl., *A.A. Roque 667* (HUFRN). Carnaúbas, 05°35'15,4"S, 37°31'20.9"W, 23.IV.2016, fl. and fr., *A.M. Marinho 237* (PEUFR). Jucurutu, 20.IV.2016, fl. and fr., *A.M. Marinho 298* (PEUFR). Lages, Fazenda Barra da Cruz, 05°41'26"S, 36°22'56"W, 13.IV.2016, fl. and fr., *L.O.F. de Souza 873* (MOSS). São João do Sabugi, base da Serra do Mulungu, 06°42'32"S, 37°10'13"W, 240 m, 18.IV.2014, fl. and fr., *J.G. Jardim 6653* (HUFRN). SERGIPE: Canindé do São Francisco, Fazenda Xingó, perto de Xingozinho, 3 km da divisa com a Bahia, 25. IV.2001, fl. and fr., *R.M. Harley 54297* (HUEFS).

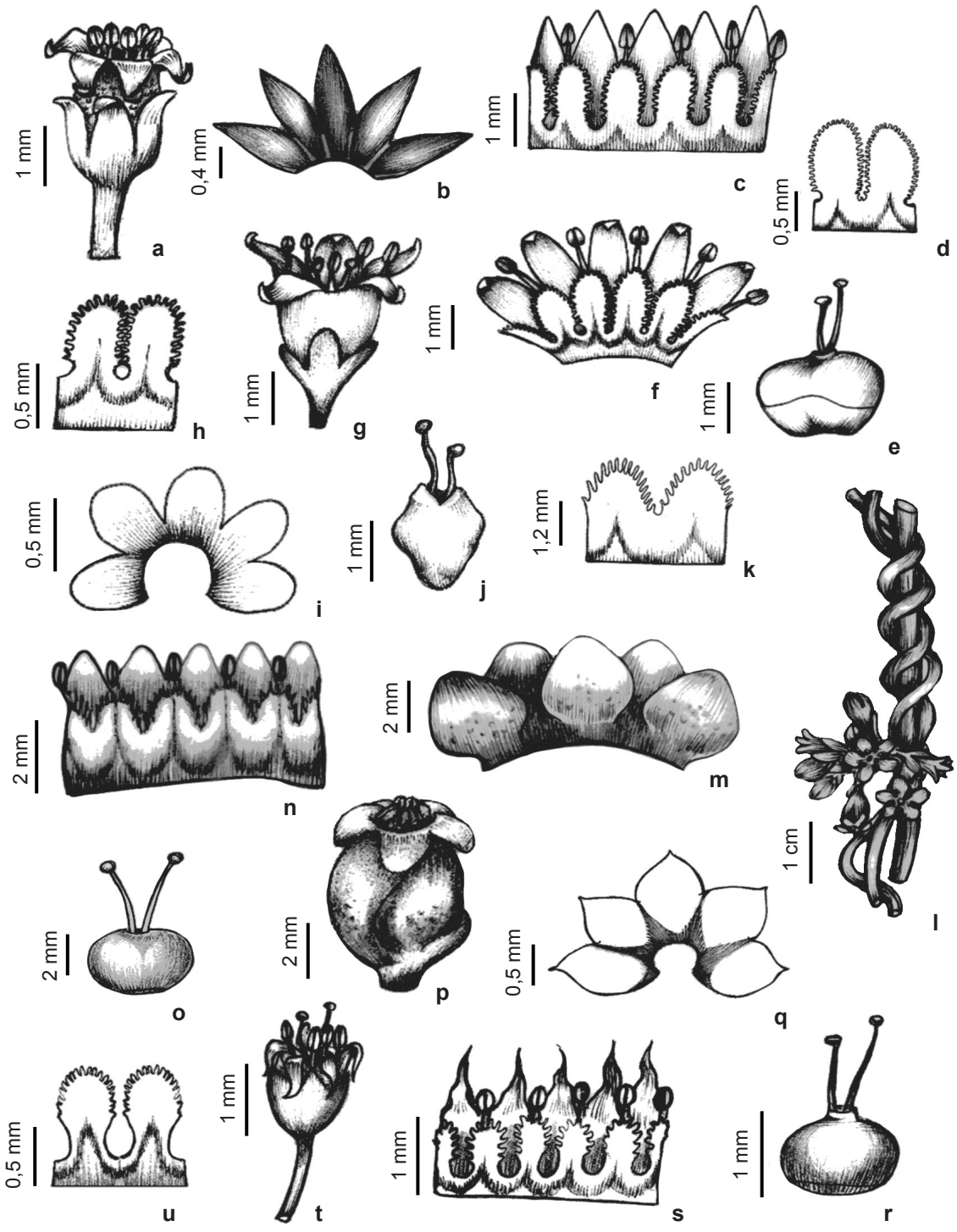

Figure 5 – a-e. *Cuscuta partita* – a. flower; b. calyx; c. corolla with infrastaminal scales; d. infrastaminal scales; e. fruit. f-j. *Cuscuta racemosa* – f. corolla with infrastaminal scales; g. flower; h. infrastaminal scales; i. calyx; j. fruit. k-p. *Cuscuta tinctoria* – k. infrastaminal scales; l. habit; m. calyx; n. corolla with infrastaminal scales; o. fruit; p. fruit. q-u. *Cuscuta umbellata* – q. calyx; r. fruit; s. corolla with infrastaminal scales; t. flower; u. infrastaminal scales. (a-e. *J.A.A.M. Lourenço et al. 110*; f-j. *S.C. Nepomuceno 60*; k-p. *S.C. Nepomuceno et al. 43*; q-u. *A.A. Roque 203*).

It is distributed in Bolivia, Colombia, Paraguay, Venezuela and Brazil (GBIF 2019), where is predominant in northeast region, besides records Minas Gerais, Goiás, Mato Grosso and Acre states (BFG 2018). This work recorded new occurrences for Alagoas, Ceará and Rio Grande do Norte states. Usually reported parasitizing *Evolvulus* L. (1762: 391) (Convolvulaceae) and *Sida* L. (1753b: 683) (Malvaceae).

In the study area can be confused with *C. umbellata* Kunth (1818: 121–122) for presenting corolla with acute lobes, but can be distinguished by its umbelliform cymes, calyx with lobes overlapping at base and erect, smooth corolla and opaque fruit, while *C. partita* has a dichasial inflorescence, calyx with lobes not overlapped, often reflexed, papillate corolla and translucent fruit. Specimens branches are usually orange when dried. Its fruit may present

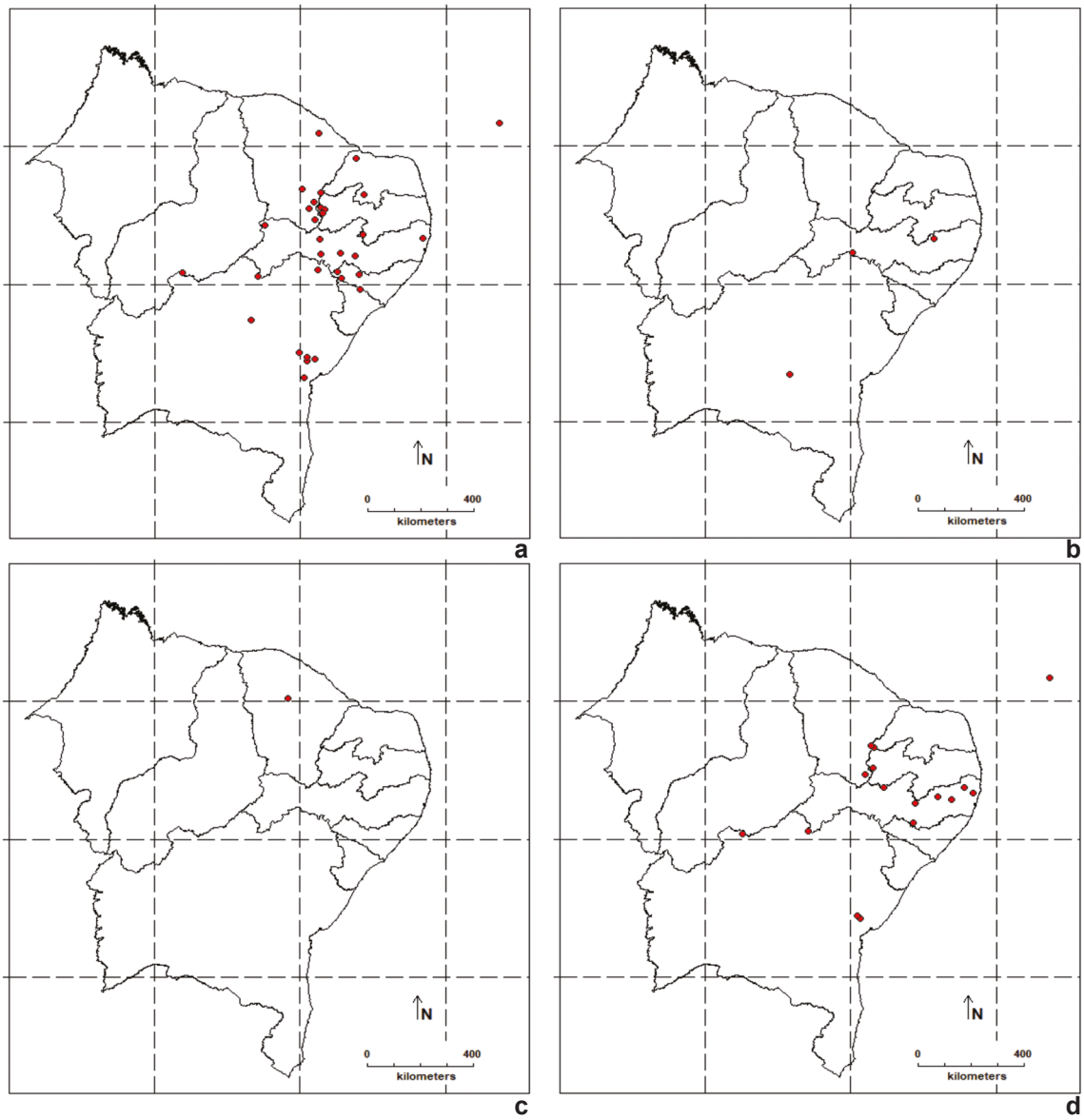

Figure 6 – a-d. Distribution maps – a. *Cuscuta americana*; b. *Cuscuta corniculata*; c. *Cuscuta corymbosa* var. *grandiflora*; d. *Cuscuta globosa.*

a late dehiscence, being difficult sometimes to determine this species employing this character.

Flowering from March to June.

6. *Cuscuta racemosa* Mart. Reise Bras. 1: 285. 1823. Type: BRAZIL. Herbidis ad Sebastianopolis. Provinciae Rio de Janeiro. Mandiocca: *C.F.P.* von *Martius 72* (lectotype, designated here, M0184374!; isolectotypes M0184376!).

Figs. 5f-j; 7b

Branches ca. 0.4 mm diam., yellow or orange. Inflorescence dichasial compound, 6–9-flowers; pedicels 0.1–0.8 mm long; bracts 1.8 × 1.6 mm, oblanceolate, apex acute, margin entire, bracteoles absent. Flowers funnelform, ca. 4 × 2 mm, white when fresh and yellow when dried, 5-merous. Calyx green, funnelform, ca. 1.3 × 1.9 mm, much shorter than the corolla tube, tube ca, 0.5 mm long, lobes equal, ca. 0.8 × 0.6 mm, not overlapped or rare overlapped at the base, apex rounded, erect, margin entire, striated. Corolla white, campanulate, tube ca. 1.8 mm long, lobes ca. 1.5 × 0.8 mm, ca. 1/2 of the corolla size, acuminate, straight or reflexed with apex inflexed, margin entire, papillate. Stamens

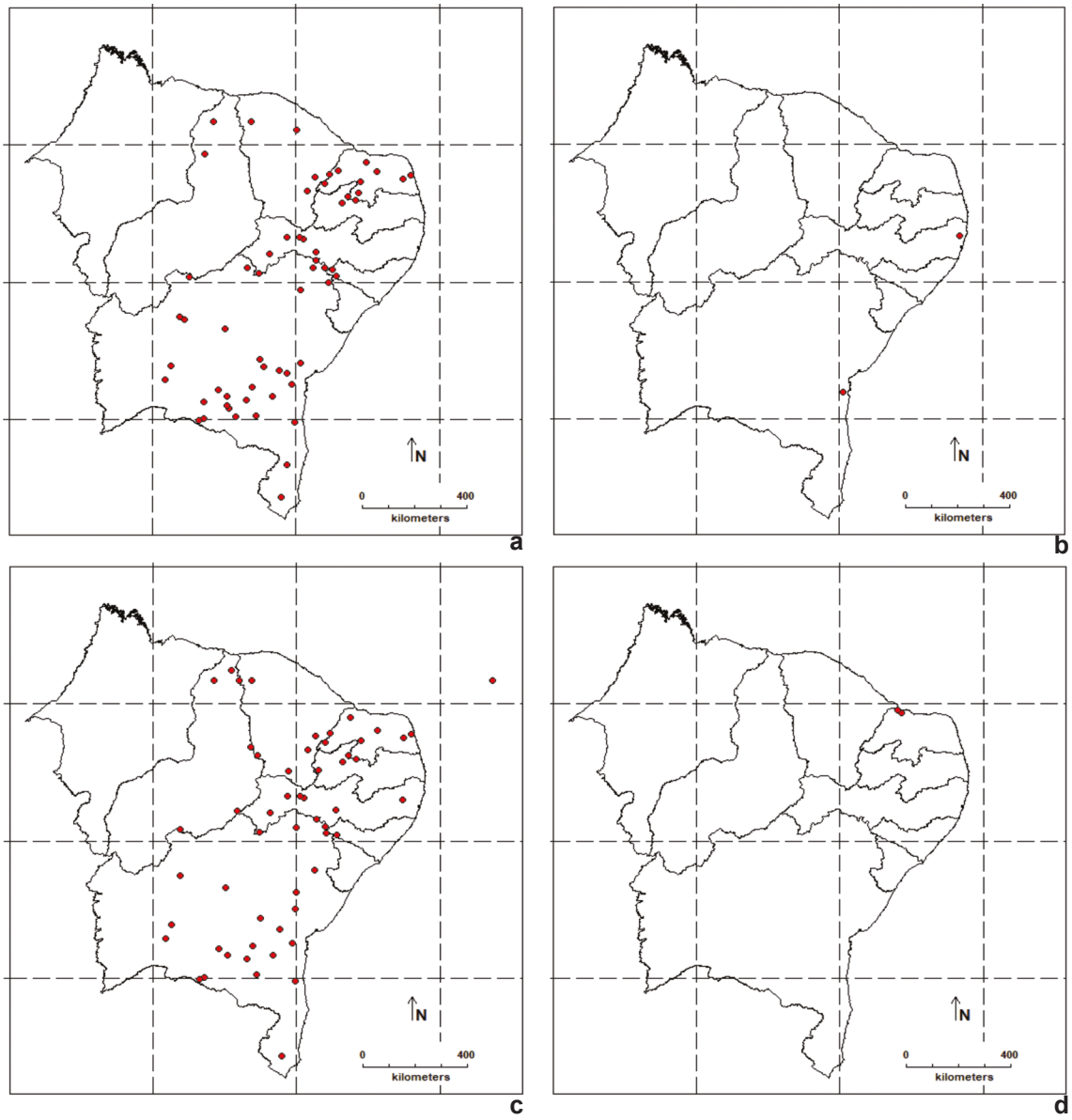

Figure 7 – a-d. Distribution maps – a. *Cuscuta partita*; b. *Cuscuta racemosa*; c. *Cuscuta tinctoria*; d. *Cuscuta umbellata.*

exserted, longer than corolla tube; anthers ca. 0.4 mm long, filament ca. 2.5 mm long. Infrastaminal scales ca. 2 mm long, as long as the corolla tube, ovate, apex rounded, bridge ca. 0.7 mm long; fimbriae of moderate density, 0.2 mm long. Carpel ca. 2.3 mm long, included; styles cylindrical ca. 0.1 mm diam.; stigma depressed-globose, ca. 0.2 mm long. Fruit indehiscent, globose to ovoid, ca. 1.6 × 1 mm, intrastylar opening present, opaque, completely involved by the persistent corolla. Seeds 4, ca. 0.7 mm long.

Examined material: BAHIA: Ituberá, estrada entre Ituberá e Taperoá, BA-001, 13°41'01.13S, 39°07'40.18"W, 11.IV.2018, fl. and fr., *S.C. Nepomuceno 60* (PEUFR). Palmeiras, trilha para Cachoeira da Fumaça em local encharcado, 12°36'14"S, 41°27'59"W, 18.V.2019, fl. and fr., *J.A.A.M Lourenço 300* (UFRPE). PERNAMBUCO: Recife, Av. 17 de agosto, Praça do Monteiro, em frente à escola Silva Jardim, 08°01'40.50"S, 34°55'40.89"W, 15.III.2017, fl. and fr., *J.A.A.M. Lourenço 64* (PEUFR).

Cuscuta racemosa is endemic to Brazil, being common in the Southern region. According to the BFG (2018), this species should be widely distributed in northeast region, reported to all states but Maranhão. However, in this study only records for the states of Bahia and Pernambuco were found. In Bahia it was found in waterlogged regions, one on the roadside near areas of anthropic influence and another on the trail of the Fumaça waterfall (Chapada Diamantina National Park). In Pernambuco, the species was found parasitizing ornamental plants in a small urban park.

From Yuncker's (1932) identification key, these specimens could be identified either as *C. decipiens* Yunck. (1921: 55) (a rare species from Mexico) or *C. gronovii* Willd. (1820: 205) (widespread in North America). But when comparing these specimens with illustrations and morphological descriptions (Yuncker 1932), the determination can easily reach *C. racemosa*. Futhermore, all morphological descriptions of *C. decipiens*, *C. gronovii* and *C. racemosa* are very similar and could be accepted to these specimens analyzed here. Thus, our decision is taken from the geographic distribution, since *C. racemosa* was described as endemic to Brazil. However, type material besides specimens from these other localities should be studied before a taxonomic decision as a synonym or not is undertaken.

The name "*Cuscuta racemosa*" was used arbitrarily in Brazilian collections for any species, sometimes completely different from each other (*C. americana* and *C. partita*, for example). This probably occurs due to the lack of elucidative bibliography for support correct identifications.

In the protologue, Martius does not report any examined material. However, exsiccates with the author's handwrites were found in M. According to Art 9.4 of the International Code of Nomenclature for Plants, algae and fungi (ICN) adopted in Shenzhen (Turland *et al*. 2018) an original material comprises those specimens that the author associated with the taxon, and that were available to the author prior to, or at the time of, preparation of the description and/or diagnosis validating the name. Therefore, the material deposited in Munich is considered as original material because it was analyzed by Martius. We found two exsiccates with his handwriting (M0184374, M0184376) and we choose the M0184374 as lectotype because it is a complete collection with flowers and fruits and matches closely with the description provided by Martius.

Flowering from March to May.

7. *Cuscuta tinctoria* Mart. *ex* Engelm. Trans. Acad. Sci. St. Louis 1: 480-481. 1859. Type: MEXICO. Oaxaca, San Luis Potosí: *W.F. von Karwinsky* (lectotype, designated by Yuncker 1932, MO 152731!; isolectotype N 336675).

= *Cuscuta orbiculata* Yunck. Amer. J. Bot. 9: 572, pl. 4. 1923. *syn. nov*. Type: BRAZIL. Cachoeira, Goiás, *Glaziou 21809* (holotype K 000196090!).

Figs. 5k-p; 7c

Branches ca. 1.7 mm diam., yellow, with papillae in the Branches more development. Inflorescence dichasial compound glomeruliform, 13–19-flowers; sessile; bracts 2.7 × 1.5 mm, rotund, apex obtuse to rounded, margin entire; bracteoles ca. 3 × 1.9 mm, obovate, apex rounded, margin entire. Flowers spherical, ca. 5.8 × 4 mm, green when fresh and brown when dried, 5-merous. Calyx green, urceolate, ca. 3.6 × 4 mm, as long, rare shorter than corolla tube, tube ca. 0.8 mm long, lobes equal, ca. 2.8 × 2.8 mm, totally overlapped, apex obtuse to rounded, erect, margin entire, slightly verrucose. Corolla white, urceolate, tube ca. 3.5 mm long, lobes ca. 1.5 × 1.3 mm, ca. 1/3 of the corolla size, rounded, reflexed com apex straight or inflexed, margin entire, smooth. Stamens exserted, longer than corolla tube; anthers ca. 0.6 mm long, filament ca. 3 mm long. Infrastaminal scales ca. 3 mm long, shorter than corolla tube, rotund, apex rounded, bridge ca. 1.5 mm long; fimbriae dense, ca. 0.4 mm long. Carpel ca. 3.7 mm long, included; styles conical ca. 0.3 mm diam.;

stigma depressed-globose, ca. 0.4 mm long. Fruit opened by circumcision, depressed-globose ca. 2.5 × 3 mm, intrastylar opening present, opaque, partially involved by the persistent corolla. Seeds 2, ca. 1.3 mm long.

Examined material: ALAGOAS: Traipu, Serra da Mãos, 21.VIII.2010, fl. and fr., *R.P. Lira-Lemos et al. 13116* (MAC). BAHIA: Santo Amaro, 1 km após Lagoa da Boa Vida, vindo de Campinho, 20.III.1980, fl. and fr., *A.P.* de *Araújo 274* (CEPEC). CEARÁ: Parambu, margem BR-020, 30 km da divisa CE/PI, 9.V.2008, fl. and fr., *A.S.F. Castro 2018* (EAC). PARAÍBA: São José de Piranhas, reservatório Morros, 07°09'09.35"S, 38°26'21.73"W, 19.V.2011, fl. and fr., *E.F.S. Silva 458* (HVASF, PEUFR). PERNAMBUCO: Fernando de Noronha, Ilha da Rata, 03°50'10"S, 32°25'30"W, 1.VI.1993, fl. and fr., *A.M. Miranda 857* (ALCB, HST); Gravatá, estrada para o parque eólico após a entrada para Pedra Branca, 08°39'35.1"S, 37°14'46.5"W, 26.IX.2017, fl. and fr., *S.C. Nepomuceno et al. 43* (PEUFR). PIAUÍ: Caracol, Serra Grande, 09°09'48"S, 43°23'07"W, 668 m, 18.VII.2011, fl. and fr., *E. Melo et al. 10139* (HUEFS). RIO GRANDE DO NORTE: Mossoró, Serra do Carmo, 05°11'15"O, 16 m, 13.V.1980, fl. and fr., *O.F. Oliveira 826* (MOSS).

Cuscuta tinctoria is cited for Mexico, Guatemala and Brazil. In the latter, is recorded for Goiás (Yuncker 1932) and has a wider distribution in the northeast region, being here presented new records for Alagoas, Paraíba and Rio Grande do Norte states.

The species can be readily distinguished by its spherical flowers of ca. 5 mm and its calyx deeply divided and lobes totally overlapped, often coming to be confused with sepals free. In the northeast region of Brazil it resembles *Cuscuta corniculata* because both present spherical flowers, but *C. tinctoria* present flowers with ca. 5 mm, with bracteoles, calyx lobes completely overlapped and corolla lobes rounded, while *C. corniculata* has flowers with ca. 2 mm, without bracteoles, calyx lobes slightly overlapped and corolla lobes acute.

After analyzing the protologues, comparing descriptions and type materials we concluded that *C. tinctoria* and *C. orbiculata* do not present significant differences to be treated as different species. Moreover, the proportions calyx/corolla (calyx as long as the corolla tube in *C. tinctoria vs*. calyx shorter than corolla tube in *C. orbiculata*) indicated by Yuncker (1932) as the only character to distinguished them, can be observed in the same individual (see Miranda *et al.* 857 - ALCB 25577, HST 9727). *Cuscuta tinctoria* has priority over the *C. orbicularia*. *Cuscuta orbiculata* was described as endemic to Brazil, referred only for Goiás, Pernambuco (Fernando de Noronha) and Bahia being known only by the holotype and the one paratype.

Flowering from May to September.

8. *Cuscuta umbellata* Kunth Nov. Gen. Sp. (quarto ed.) 3: 121-122. 1818[1819]. Type: MEXICO. Queretaro Salamanca [Nov. gen. sp. : Crescit in Nova Hispania, inter Queretaro et Salamanca]: *A.J.A. Bonpland & F.W.H.A. von Humboldt 4338* (holotype P 00670787!, isotype MO 4074374!).

Figs. 5q-u; 7d

Branches 0.05–0.2 mm diam., yellow. Inflorescence cyme umbeliform, flowers 5–8; pedicels 0.9–2.2 mm long; bracts 1–1.5 × 0.7–1 mm, deltoids to rhombic, apex acute, margin entire; bracteoles absent. Flowers ca. 2 × 1.5 mm, white when fresh and yellow when dried, 5-merous. Calyx funnelform, 1–1.4 × 1.2 mm, as long as the corolla tube, tube ca. 0.7 mm long, lobes equal, 0.4–0.7 mm long, overlapping at base, apex acuminate to acute, erect, margin entire, striated. Corolla white, urceolate, tube 0.5–1 mm long, lobes 1–1.5 × 0.3–0.7 mm, ca. 2/3 of the corolla size, acute, straight or reflexed with apex inflexed, margin entire, smooth. Stamens exserted (included when the corolla lobes are erect) longer than corolla tube; anthers ca. 0.3 mm long, filament ca. 1 mm long. Infrastaminal scales 0.8–1 mm long, longer than corolla tube, ovate, apex rounded, bridge ca. 0.2 mm long; fimbriae of moderate density, 0.05–0.2 mm long. Carpel ca. 1.8 mm long, exserted; styles cylindrical ca. 0.1 mm diam.; stigma globose, ca. 0.1 mm long. Fruit opened by circumcision, globose to depressed-globose, ca. 1 × 1.2 mm, intrastylar opening present, opaque, completely involved by the persistent corolla. Seeds 2, ca. 0.8 mm long.

Examined Material: RIO GRANDE DO NORTE: Areia Branca, salina Augusto Severo, 17.V.2007, fl. and fr., *A.A. Roque 53* (HUFRN). Grossos, salina Caenga, 12.V.2007, fl. and fr., *A.A. Roque 96* (HUFRN); salina Salmar, 28.VI.2017, fl. and fr., *A.A. Roque 203* (HUFRN).

Cuscuta umbellata is found from United States, Mexico, Suriname, Guyana, Venezuela and Brazil (Yuncker 1932; Correll & Johnston 1970; Funk *et al.* 2007; Hokche *et al.* 2008; Villaseñor 2016), where, according with BFG (2018) was recorded for Piauí, Ceará and Rio Grande do Norte states. However, specimens from Ceará and Piauí were not located, and here we consider its distribution restricted to Rio Grande do Norte state, growing in saline regions.

It resembles *C. partita* due to corolla with acute to acuminate lobes but can be distinguished by a set of characteristics pointed out in the comments of this species.

Flowering from May to June.

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