



Chamaecrista rotundifolia: A new distributional record from savanna zone of Senegal, West Africa

Samba Laha KA¹✉, Abdoul Aziz CAMARA¹, Ndongo DIOUF¹, Moustapha GUEYE², Mame Samba MBAYE¹, Kandioura NOBA¹

¹Laboratoire de Botanique-Biodiversité, Université Cheikh Anta DIOP, BP: 5005 Dakar, SENEGAL.

²Centre de Recherches Agricoles de Saint Louis, BP: 53 Saint Louis, SENEGAL.

✉ **Corresponding author:**

Samba Laha KA, E-mail: kasam74@gmail.com

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General Note

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ABSTRACT

A new species for Senegal, West Africa, *Chamaecrista rotundifolia*, is described, illustrated and compared with other species of this genus. The new species differs from the four species of *Chamaecrista* reported in the Senegalese flora by: prostrate herb; leaflets one pair; rounded-ovate. In addition, the pedicel is much longer than the flower it supports. In Upper Casamance, *Chamaecrista rotundifolia* occurs mainly on pastures land and short fallow. Based on IUCN Red List categories, the species is classified as NT (not threatened).

Keywords: *Chamaecrista rotundifolia*, new species, Senegal, Taxonomy.

1. INTRODUCTION

Tropical Africa is known as one of the most important species-rich biodiversity regions in the world resulting from the combined interaction of its geography, climate, patterns of seasonal rainfall and particular ecosystems. According to Sosef et al. (2017), in tropical Africa, the central African forests represent the most species rich block with 10,306 species, followed by the east African forests and West Africa with respectively 6,789 and 4,396 species.

Located at the western edge of this zone, Senegal is a country where the Sahelian, Sudanian, and Guinean floristic regions intersect. The Senegalese flora is estimated to contain around 1,921 species (Sosef et al., 2017), among them 26 species are endemic (Ba & Noba, 2001) and exclusively found along the Atlantic coast in the Western and in the south-eastern part of the country where the Fouta Djallon range just reaches Senegal. With over 379 species, the Leguminosae is the first largest angiosperm family in terms of species numbers before Poaceae (285 species) and Cyperaceae (188 species). Economically, Leguminosae is also first in importance because Peanut belongs to this family and represents the first cash crop in Senegal (ANSD, 2014).

The Legume Phylogeny Working Group (LPWG) studies recognize six subfamilies in Leguminosae: *Caesalpinioideae*, *Cercidoideae*, *Detarioideae*, *Dialioideae*, *Duparquetioideae* and *Papilionoideae*.

This new classification is based on plastid *matK* gene sequences which have been the most widely sequenced across the legumes (LPWG, 2017). The genus *Chamaecrista*, belongs to the family Leguminosae, subfamily *Caesalpinioideae*. In Senegal, the genus *Chamaecrista* is represented by four (4) species and have been widely used as food, as fodder and in traditional medicine.

During a field survey of the vegetation of pastures land in Kolda district, we observed a plants which appears to be a species of genus *Chamaecrista*. However, detailed studies showed that they were different from the known species of *Chamaecrista* reported in Senegalese flora. After morphological examination and literature review, the species was identified as *Chamaecrista rotundifolia* (Greene, 1994; Wunderlin & Hansen, 2000), thereby increasing the number of recorded species of *Chamaecrista* in Senegal from 4 to 5 species. So the species is reported here as a new addition to the genus *Chamaecrista* in Senegal.

2. MATERIALS AND METHODS

This research was carried out in the district of Kolda (12° 53'N, 14° 57'W), located in a savanna zone of southern Senegal. The Kolda district is located about 450 km south of Dakar the capital city of Senegal. It is bordered in the north by the Gambian border, in the east by the district of Tambacounda, in the west by the district of Sedhiou and in the south by the republics of Bissau Guinea and Conakry Guinea. The climate is sudanian, tropical hot and humid with a rainy season (June through October) and a dry season (November through May). The average temperature is 28°C and the mean rainfall is around 1,191 mm per year. Samples collected were examined and morphological studies were conducted in the Kolda Livestock Research Center and Herbarium of CheikhAnta Diop University. For the present study, we followed classic taxonomic morphological methods. We described vegetative and reproductive parts, from both live plants and herbarium specimens. The characteristics of vegetative and reproductive organs (port, leaf, stigma, stamen ...) and any specific features were examined using a digital microscope (500x) and Canon Lens 58mm.

Data were analysis using hierarchical cluster by Ward method, followed by Euclidean distance to determine degree of similarity based on morphological characters between five species of *Chamaecrista*, reported in Senegal Cluster analysis was performed by R Version 3.6.2 (Library *pvclust*).

3. RESULTS AND DISCUSSION

The New Species

Scientific name: *Chamaecrista rotundifolia* (Pers.) Greene

Synonyms: *Cassia bifoliolata* Collad.

Cassia monophylla Vell.

Cassia pentandra Raddi

Cassia pentandria Larranaga

Chamaecrista bifoliolata (Collad.) Greene

Cassia rotundifolia Pers.

Description of *Chamaecrista rotundifolia* Pers.

Herb (<10 cm), woody at the base. Branches prostrate, pilose. Leaflets in one (1) pair, sessile, 0.5 to 3 cm long, obovate, apex rounded, very asymmetrical at base; petiole 2-3 mm, gland absent. Stipules foliaceous; ovate, 7-10 mm long. Flowers yellow, long pedicillate, solitary in the axils of leaves. Sepals hairy. Anthers large, subsessile. Pod flattened (18-30 cm), black-brown, valves curling

on dehiscence; seeds 8-15. Weedy plant. In Upper Casamance, the species is found mainly in pastures land and short fallow (Figure 1).



(a)



(b)



(c)



(d)



(e)



(f)

Figure 1: *Chamaecrista rotundifolia* (Pers.) Greene. (a) Flowering plant ; (b) Leaf ; (c) Stipules ; (d) Fruit ; (e) Pedoncule ; (f) Flower.

Key to the species of *Chamaecrista* of Senegal

1. Prostate herb; leaflets one pair; rounded-ovate.....*C. rotundiflora*
2. Erect herb; leaflets more than one pair.....3
3. Leaflets less than 10 pairs.....4
- Leaflets 10 pairs or more.....5
4. Pod, more than 10 cm; petiole and rhachis with glands.....6
- Pod less than 10 cm pubescent. Petiole and rhachis without glands.....7
5. Leaflets 25-40 pairs; linear. Flowers solitary or 2-3 in the axils of the leaves. Pod 40-50 x 4-5 mm...*C. mimosoides*
- Leaflets 10-20 pairs; oblong. Flowers solitary or axillary fascicle. Pod 20-25 x 3-4 mm*C. nigricans*
6. Pod flattened8
7. Pod (3-4.5 cm) pubescent. Leaflets 3-10 pairs oblong.....*C. jaegeri*
8. Leaflets 2 pairs Sterns and leaves viscid-glandular. Pod oblong; glandular-strigose.
Flowers yellow or reddish; in lateral or terminal racemes.....*C. absus*

Similarity between the species

Dendrograms showing the relationship of the five (5) species, based on similarities of their morphological characters (Figure 2) and the cluster suggests an existence of two groups. Among all the the species, *Chamaecrista rotundifolia* is mostly related to *Chamaecrista jaegeri* and *Chamaecrista mimosoides* (33-58%).

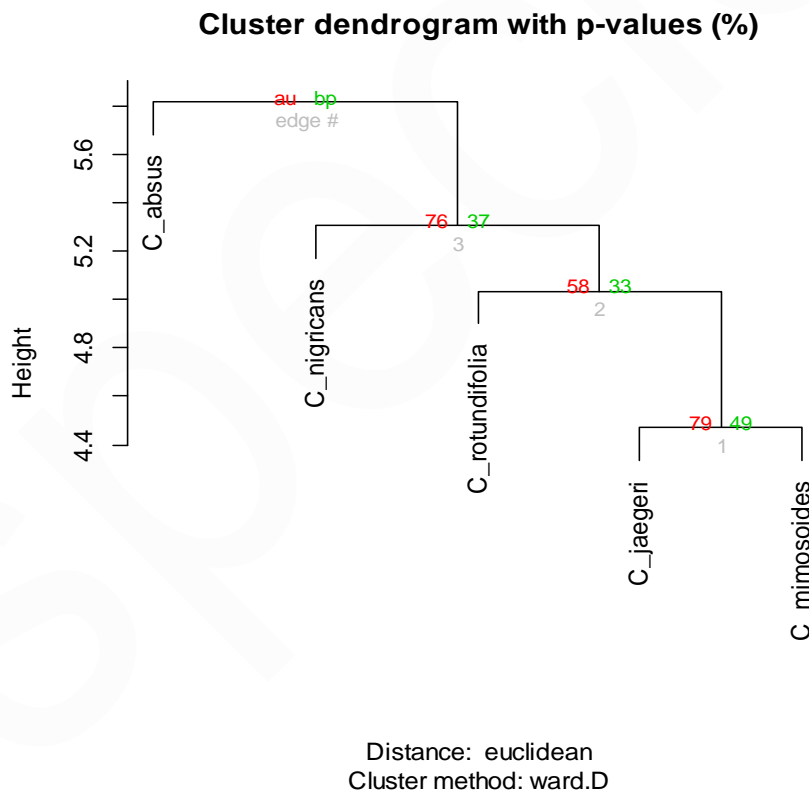


Figure 2: Dendrogram of clustering of genus *Chamaecrista* reported in Senegal.

Phenology

During two years, we observed the emergence of the seedlings from the first rain (late June - early July). Flowering occurs between late August and September. Fruiting were noticed from late September to November. Along Kolda River, the species growth will continue two months after the end of rainy season.

Distribution

According to Wunderlin & Hansen (2000), *Chamaecrista rotundifolia* is native to Florida (United States) and Mexico, then widespread in Central America and in northern South America. Also found in Caribbean islands (Cuba, Puerto Rico and Jamaica). The species is also encountered as an introduced species in natural habitats in some part of Central and West Africa (CJBG, 2019). In the savanna zone of Senegal, it grows in sandy to sandy clay soil.

Uses/applications

Chamaecrista rotundifolia is a subject of many uses and applications. In Brazil and Australia, they are sown into natives pastures to augment feed quality or improved grasses. It also used in China for restoring soil fertility and in Nigeria as phase legume in crop-livestock systems where it improved cereal production (Tarawali & Peters, 1997).

Conservation status

Based on the IUCN category, the species is classified as **Not Threatened** (NT) (IUCN, 2012). Since 2017, the species has been collected each year and we noticed an increasing of abundance particularly in pastures land.

Data availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of interest

The authors declare that there are no conflicts of interest.

Author's Contribution

SLK, AAC and ND collected and prepared herbarium specimen. SLK, AAC wrote the first draft. All authors have read and approved the final manuscript.

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