

Practical identification key for 14 Rubiaceae weed species of western and central Africa.

The biology and ecology of weed species must be fully defined before developing strategies to control them. An identification key was developed for Rubiaceae weed species based on vegetative characters, as is a followup to the key already drawn up for the *Sida* L. genus (VIAROUGE *et al.*, 1995).

The identification key

This key is meant to be an aid for the identification of 14 Rubiaceae species of western and central Africa, belonging to five different genera (Table 1): *Diodia* Linn., *Kohautia* Cham. & Schlecht., *Mitracarpus* Zucc., *Oldenlandia* Linn., and *Spermacoce* Dill. ex L. (formerly *Borreria* G. F. W. Mey.).

Identification characters

Data for this identification key were obtained from studies carried out on various flora species in different countries, i.e. in Senegal (BERHAUT, 1967), West Africa (HUTCHINSON *et al.*, 1958), Togo (BRUNEL, 1984), the Indian Ocean region (BOSSER *et al.*, 1989) and Guadeloupe (FOURNET, 1978). In addition, agronomic reference works were consulted, along with an analysis of herbarium

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Rubiaceae family

General characteristics

The Rubiaceae family is extremely large, including 500 genera and nearly 7 000 species (HEYWOOD, 1978). It is a cosmopolitan family, mainly of tropical species, but the herbaceous species are more common in temperate regions.

The leaves are entire, opposite, sometimes whorled, and have no stipules. The flowers are regular. The calyx is gamosepal and its basal part is fused with the ovary. The corolla is formed by 4-5 petals fused at the base. There is the same number of stamens and petals. They are fused in the corolla tube or throat. The ovary generally consists of 1-10 loculi. The fruit is a capsule, berry or drupe. The seeds contain a fleshy albumen and are often winged.

Economic importance

Rubiaceae species are of considerable economic importance. The best known products are coffee (*Coffea*) and quinine (*Cinchona*). Some genera are used to produce dyes (*Rubia*, *Uncaria*), or are tapped for their medicinal properties (*Cephaelis*). There are also many ornamental plants in this family, such as *Gardenia* and *Ixora*.

samples from CIRAD and the Institut de Botanique (Montpellier, France).

Eight vegetative characters (Table 2) are taken into consideration in the key: stem (shape, pubescence), leaf (phyllotaxis, lamina shape, pubescence, margin), stipular sheath (size, size of stipule segment).

All identification characters are readily visible and no special botanical knowledge is required to assess them.

Several keys were drawn up by investigating different combinations of characters (Table 2), but not all were suitable for identifying the 14 species. A single key, applicable for all cases, was finally developed. However, it is sometimes complicated to differentiate species belonging to the same genus because of variability in the vegetative characters. In such cases, accurate identifications can be made on the basis of flower traits.

Table 1. Liste of species and synonyms.

Valid name	Synonym
<i>Diodia sarmentos</i> Swartz	<i>Diodia scandens</i> Swartz, sensu FWTA, ed 2 <i>Diodia breviseta</i> Benthim <i>Diodia pilosa</i> Schumacher & Thonning <i>Diodia riparia</i> Sagot <i>Diodia rubricosa</i> Chev Spermacoce palmatorum DC. Spermacoce pilosa (Schumacher & Thonning) DC. Spermacoce spinosa Loefl.
<i>Kohautia grandiflora</i> DC.	<i>Oldenlandia grandiflora</i> (DC.) Hiern
<i>Kohautia senegalensis</i> Cham. Schlecht	<i>Oldenlandia senegalensis</i> (Cham. & Schlecht) Hiern <i>Oldenlandia confusa</i> Hutch. & Dalz
<i>Mitracarpus villosus</i> (Swartz) DC.	<i>Mitracarpus scaber</i> Zuccarini <i>Mitracarpus senegalensis</i> DC. <i>Mitracarpus hirtus</i> (Swartz) DC. sensu FL.Bras. <i>Mitracarpus verticillatus</i> (Schumacher & Thonning) Vaire Spermacoce hirta L. Spermacoce villosa Swartz <i>Siaurospermum verticillatum</i> (Schum. Thonn.)
<i>Oldenlandia corymbosa</i> Lin.	<i>Hedyotis alsinaefolia</i> Br. <i>Hedyotis burmanniana</i> Br. <i>Hedyotis corymbosa</i> (L.) Lamk. <i>Hedyotis biflora</i> Roth <i>Hedyotis graminicola</i> Kuz. <i>Hedyotis intermedia</i> W et A. <i>Cerantogea biflora</i> Cham & Schlecht. <i>Oldenlandia alsinifolia</i> Don. <i>Oldenlandia billora</i> Lam. <i>Oldenlandia herbacea</i> DC. <i>Oldenlandia ramosa</i> Roxb. <i>Oldenlandia scaberrima</i> DC. <i>Hedyotis herbacea</i> Linn. <i>Oldenlandia Heynei</i> G Don <i>Oldenlandia Virgata</i> Chev.
<i>Oldenlandia herbacea</i> (Linn.) Roxb.	
Spermacoce chaetocephala DC.	<i>Borreria chaetocephala</i> (DC.) Hepper <i>Borreria compacta</i> Berhaut <i>Borreria compacta</i> (Hiern) K. Schumann <i>Borreria ruelliae</i> (F.W.T.A., not DC.) K. Schumann Spermacoce compacta (Hiern) Spermacoce hebecarpa (A. Richard) Oliv. var. minor Hiern Spermacoce hebecarpa Hutch. ex A. Richard Oliver Spermacoce kotschyana Oliver
Spermacoce latifolia Aublet	<i>Borreria alata</i> (Aublet) DC. <i>Borreria bartlingiana</i> DC. <i>Borreria perrottetii</i> DC. <i>Borreria latifolia</i> Aublet K. Schumann <i>Borreria scaberrima</i> Boid. Spermacoce caerulescens Aublet
Spermacoce octodon (Hepper) Lebrun & Sork	<i>Borreria octodon</i> Hepper <i>Borreria meizei</i> Assemin <i>Borreria setosa</i> (Hiern) K. Schumann <i>Borreria setosum</i> Hiern <i>Octodon setosum</i> Hiern
Spermacoce ocymoides Burman f.	<i>Borreria ocymoides</i> (Burman f.) DC. <i>Borreria ramisparsa</i> DC. <i>Borreria setidens</i> Moq. Spermacoce ramisparsa (DC.) Hiern Spermacoce roxburghiana Wall. Spermacoce stricta Schlecht. <i>Tardavel ocymoides</i> (Burman f.) Hiern
Spermacoce radiata (DC.) Sieber ex Hiern	<i>Borreria radiata</i> DC.
Spermacoce ruelliae DC.	<i>Borreria articulata</i> (L.f.) FN Williams <i>Borreria hispida</i> (L.) Schumacher <i>Borreria ruelliae</i> (DC.) Schumann ex H. Thoms <i>Borreria scabra</i> (Schumacher & Thonning) K. Schumann <i>Diodia scabra</i> Schumacher & Thonning Spermacoce hispida L.f.
Spermacoce stachydea DC.	<i>Borreria stachydea</i> (DC.) Hutchinson & Dalziel Spermacoce leucarda Hutchstetter ex Hiern. <i>Borreria leucarda</i> (Hutchstetter ex Hiern.) K. Schumann
Spermacoce verticillata L.	<i>Borreria verticillata</i> (L.) G. Meyer Spermacoce globosa Schumacher & Thonning

Starting point: lamina shape

The 14 species can be separated into two categories on the basis of lamina shape (Figure 1), i.e. those with a linear lamina and those with an oblong to elliptical lamina.

In the oblong to elliptical lamina group, *Mitracarpus villosus* is distinguished by its square stem with rounded angles.

If the stem angles are sharp, then it is *S. chaetocephala*.

Leaf pubescence has to be assessed if the stem angles are winged. *S. ocymoides* has glabrous leaves, while those of *S. latifolia* are pubescent and those of *D. sarmentos* are scabrous on the upper surface and pubescent underneath.

In the linear lamina group, the leaves of *S. verticillata* are arranged in pseudo-whorls.

In the group of species with opposite leaves, the size of the dentate stipular collar is the key feature. Among the four species with a collar of 6 mm or less, *Kohautia* species can be distinguished by a groove that is present on all four sides of the stem. The lamina of *K. grandiflora* is 50-70 mm long and 3-5 mm wide, while that of *K. senegalensis* is narrower and shorter (30-50 x 2-3 mm).

Oldenlandia species have a square winged stem. *O. herbacea* differs from *O. corymbosa* by its highly branched, totally glabrous stem and its spherical tufted habit.

Size of stipule segment is the next trait to consider in species with a sheath of more than 6 mm. In the two species with teeth that are markedly longer than the base of the sheath, *S. radiata* can be readily identified by its cartilaginous white margin, while that of *S. octodon* is scabrous.

Stem shape should be assessed if the sheath is the same size as the teeth. *S. stachydea* has a pubescent stem with rounded angles, while *S. ruelliae* has winged angles and sparsely pubescence.

Tableau 2. Characteristics of Rubiaceae species of western and central Africa.

Species	Stem		Lamina			Stipulatory sheath			
	Shape	Pubescence	Phyllotaxis	Shape and size	Upper surface	Under surface	Margin	Size	Stipule segment
<i>Diodia sarmentosa</i>	square, winged	scabrous angles smooth sides	opposite	oblong-lanceolate 30-60 x 10-25 mm	scabrous	pubescent	scabrous	7-10 mm	8 to 10 slender 5-7 mm
<i>Kohautia senegalensis</i>	square grooved on each side	glabrous	opposite decussate	linear 30-50 x 2-3 mm	glabrous	glabrous	glabrous with toothed base	3-5 mm	1 to 3 3 mm
<i>Kohautia grandiflora</i>	square grooved on each side	glabrous	opposite	linear 50-70 x 1-2 mm	glabrous	glabrous	glabrous with toothed base	3-5 mm	1 to 3 3 mm
<i>Mitracarpus villosus</i>	square with rounded angles	pubescent	opposite decussate	elliptical-lanceolate 30-60 x 7-15 mm	variable from glabrous to scabrous	glabrous*	scabrous	3-6 mm	10-15 slender 1-3 mm
<i>Oldenlandia corymbosa</i>	square, winged	scabrous angles smooth sides	opposite decussate	linear-lanceolate 20-40 x 1-4 mm	variable	glabrous*	scabrous and cartilaginous	4-8 mm	3 to 5 1-2 mm
<i>Oldenlandia herbacea</i>	square, winged	glabrous	opposite	linear 15-40 x 1-2 mm	glabrous*	glabrous*	scabrous	3-6 mm	1 to 3 2-3 mm
<i>Spermacoce chaetocephala</i>	square	scabrous angles smooth sides	opposite decussate	elliptical-lanceolate 30-70 x 4-15 mm	pubescent or scabrous	pubescent or scabrous	scabrous	5-9 mm pubescent	5 to 7 slender 2-4 mm
<i>Spermacoce latifolia</i>	square, winged	pubescent	opposite decussate	oblong-lanceolate 50-80 x 20-30 mm	pubescent	pubescent	scabrous	7-15 mm	7 to 10 5-12 mm
<i>Spermacoce octodon</i>	square with rounded angles	slightly pubescent	opposite	linear 50-80 x 3-5 mm	slightly scabrous	glabrous*	scabrous	13-18 mm pubescent	10 to 15 slender 8-11 mm
<i>Spermacoce ocymoides</i>	square, winged	glabrous angle slightly scabrous	opposite	oblong-elliptical 15-30 x 5-12 mm	glabrous	glabrous*	scabrous	7-10 mm	5 to 7 2-3 mm
<i>Spermacoce radiata</i>	round finely striated	hispid pubescent	opposite	linear 30-60 mm	glabrous	glabrous*	white and cartilaginous	8-13 mm pubescent	10 to 15 6-10 mm
<i>Spermacoce ruelliae</i>	square, winged	pubescent	opposite	linear-lanceolate 30-90 x 5-16 mm	scabrous	scabrous	scabrous	10-14 mm	12 to 16 5-7 mm
<i>Spermacoce stachydea</i>	square with rounded angles	pubescent	opposite	linear-lanceolate 30-90 x 7-20 mm	scabrous	scabrous	scabrous	6-10 mm pubescent	7 to 10 3-5 mm
<i>Spermacoce verticillata</i>	variable	glabrous to glabrate	opposite in pseudo-whorls	linear-lanceolate 30-50 x 5-10 mm	glabrous	glabrous*	scabrous	6-8 mm	5 to 7 3-4 mm

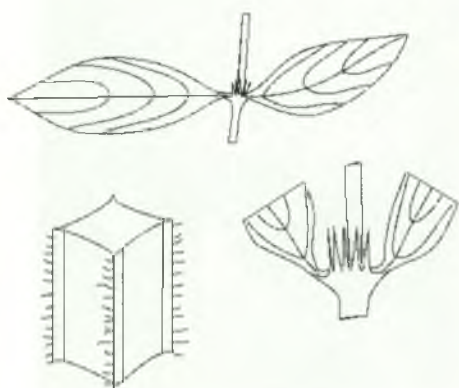
* The under surface of the leaves is glabrous except around the veins.

Species descriptions are given to enable the user to confirm the identification of species with similar vegetative structures.

Species descriptions

All are herbaceous species, generally with a square stem. The leaves are entire and opposite, and the median veins on the upper surface are depressed. They are sessile to subsessile, and the lamina base terminates with a dentate stipular sheath. The white flowers, pink- and sometimes blue-tinged, are arranged in axillary or terminal inflorescences and rarely solitary. The entire leaf margins are scabrous or partially scabrous.

Diodia sarmentosa Swartz



D. sarmentosa is a weed of forest regions with a creeping branched habit. The slender stem is square and winged, and only the angles are pubescent. The oblong-lanceolate lamina (30-60 x 10-25 mm) is scabrous above and pubescent underneath. The stipular sheath (7-10 mm high) is tipped with several pointed teeth (5-7 mm long).

D. sarmentosa is similar to *S. latifolia*, but the latter species has a pubescent stem, while only the stem angles of *D. sarmentosa* are pubescent.

		<i>Mitracarpus villosus</i>	
		<i>Spermacoce chaetocephala</i>	
			<i>Spermacoce ocyroides</i>
			<i>Spermacoce latifolia</i>
			<i>Diodia sarmentosa</i>
			<i>Spermacoce verticillata</i>
			<i>Kohautia senegalensis</i>
			<i>Kohautia grandiflora</i>
			<i>Oldenlandia corymbosa</i>
			<i>Oldenlandia herbacea</i>
			<i>Spermacoce radiata</i>
			<i>Spermacoce octodon</i> Cartilaginous white margin
			<i>Spermacoce stachydea</i> Scabrous margin
			<i>Spermacoce ruelliae</i>

Figure 1. Identification key for Rubiaceae species.

Kohautia Cham. & Schlecht.



K. grandiflora and *K. senegalensis* are upright (up to 90 cm tall). All sides of their square stems are grooved from top to bottom. The leaves are linear and glabrous. The

stipular sheath is fine (3-5 mm) and tipped with 1-3 teeth (3 mm) each side of the leaf base.

Although both species may be recognized by the size of the lamina, identification is easier if the plants are flowering.

K. grandiflora

K. grandiflora has red to pink flowers arising from a short pedicel (1-2 mm). The corolla has an oval lobe. The corymbiform inflorescence is compressed. The fruit is a sessile globular capsule. From a vegetative viewpoint, the stem of *K. grandiflora* can be slightly scabrous at the angles, with a linear lamina of 50-70 mm x 35 mm.



Kohautia grandiflora.
Photo H. Merlier

K. senegalensis

K. senegalensis has single white to deep-pink flowers, arising from a 2-10 mm long pedicel. They are arranged in a diffuse inflorescence. The corolla has a linear lobe. The fruit is a globular pendunculate capsule. The linear lamina (30-50 x 2-3 mm) is narrower and shorter than that of *K. grandiflora*.

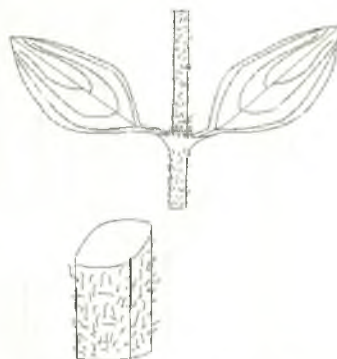


Kohautia senegalensis.
Photo T. Le Bourgeois

Similar species

Although *Kohautia* species are similar to *Spermacoce octodon* and *S. radiata* in appearance (linear leaf, upright habit), their short stipular sheath with 1-3 teeth distinguishes them from the two *Spermacoce* species, which have multiple pointed dentation sheaths.

Mitracarpus villosus
(Swartz) DC.



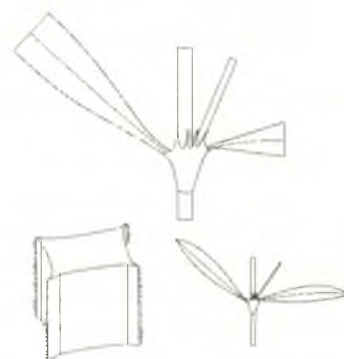
Mitracarpus villosus.
Photo T. Le Bourgeois

M. villosus is characterized by a square pubescent stem with rounded angles. The elliptical lanceolate leaves (30-60 x 7-15 mm), with short petioles, have a lamina that is always glabrous underneath, but only slightly scabrous, pubescent or glabrous above. *M. villosus* can also be recognized by its fruit, i.e. a pyxidium

with two loculi, each containing a seed. The small, white flowers are arranged in axillary glomerules.

This species is common throughout intertropical Africa, and could have been first introduced from the West Indies during the 19th century.

Oldenlandia corymbosa
Linn.



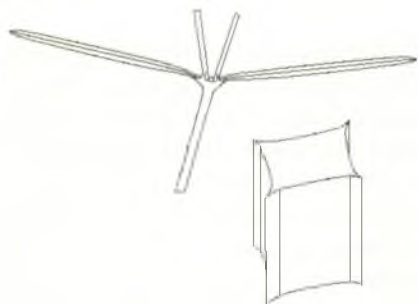
Oldenlandia corymbosa.
Photo T. Le Bourgeois

O. corymbosa has a semi-upright habit (20-40 cm) and grows in slightly branched, diffuse tufts. The square slender stem is finely winged, with scabrous angles. The linear-lanceolate leaves (20-40 x 1-4 mm) are connected to a stipular sheath tipped with 3-5 teeth. The lamina is dark green, slightly pubescent and can be somewhat scabrous above, while it is pale green and glabrous underneath.

The flowers form pauciflorous corymbs of 2-5 white flowers. The fruit is an oval dehiscent capsule with two loculi containing many seeds.

This species is generally encountered on degraded sandy soils or as a ruderal species. It is present in all hot regions of the world.

Oldenlandia herbacea (Linn.) Roxb.



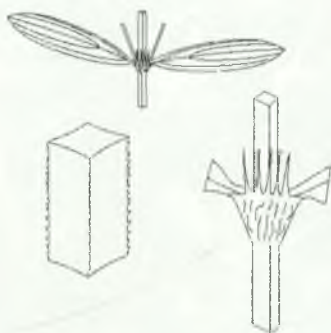
O. herbacea has an upright tufted habit (7-60 cm). The winged square stem is glabrous and highly branched. The leaves are linear (15-40 x 1-2 mm) and glabrous. The stipular collar is short (26 mm) with 1-3 teeth. The flowers are generally solitary. The fruit is a round bilocular capsule containing many smooth brownish seeds.

It is possible to distinguish the two species by their habit. *O. herbacea* is upright and grows in compact tufts, while *O. corymbosa* has a semi-upright habit, and a slender stem with relatively little branching. In addition, *O. corymbosa* flowers are grouped while those of *O. herbacea* are generally solitary.

Spermacoce chaetocephala DC.

S. chaetocephala is an upright plant that can grow up to 60 cm high. The stem is square and glabrous with scabrous angles. The linear elliptical leaves (30-70 x 4-15 mm) are pubescent to scabrous. The stipular sheath is pubescent, tipped with sharp 2-4 mm teeth (5-7). The many small

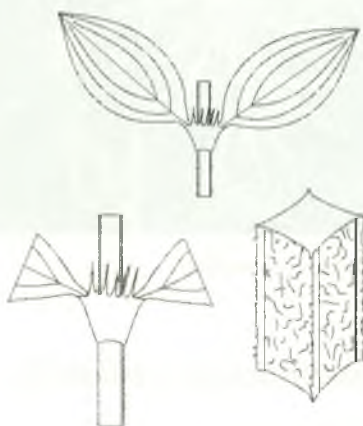
white flowers are sessile and grouped in dense glomerules of about 2 cm.



S. chaetocephala could be confused with species with a linear lamina, but the lateral leaf veins are marked and protrude underneath.

There are two varieties of this species, according to the Flora of West Tropical Africa (HUTCHINSON *et al.*, 1958): *S. chaetocephala* var. *chaetocephala*, with a robust stem and a 4-15 mm lamina, and *S. chaetocephala* var. *minor*, with a slender stem and a lamina that is never wider than 4 mm.

Spermacoce latifolia Aublet



S. latifolia can be identified by its blue-tinged flowers, grouped in dense axillary glomerules, and by its creeping habit. It has a winged, square, pubescent stem, with roots sometimes growing from the nodes. The pubescent leaves are oblong-lanceolate (50-80 x 20-30 mm). The



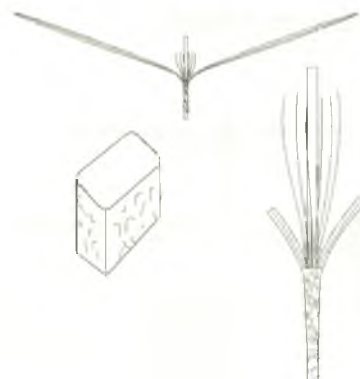
Spermacoce chaetocephala.

Photo T. Le Bourgeois

stipular sheath (7-15 mm) is tipped with pointed teeth that are longer than the base of the sheath.

This weed, which originates from South America, flourishes in forest regions.

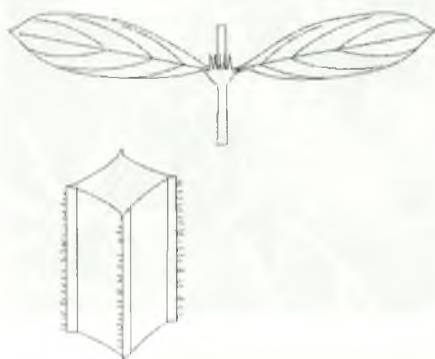
Spermacoce octodon (Hepper) Lebrun & Stork



S. octodon is a savanna weed with an upright habit (20-50 cm). The leaves are linear (50-80 x 3-5 mm), slightly scabrous above and glabrous underneath. A narrow, lightly pubescent stipular sheath extends from the leaf base. The sheath (13-18 mm) has many very fine teeth that are markedly longer (8-11 mm) than the base. The white flowers are arranged in a terminal glomerule.

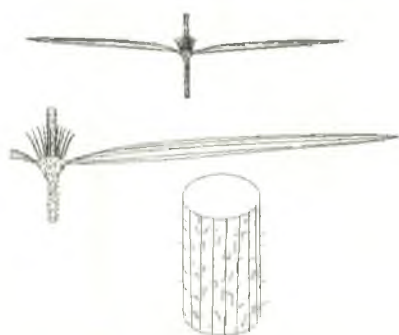
The stipular sheath distinguishes *S. octodon* from *Kohautia* species, i.e. *Kohautia* plants have a sheath with only 2-3 teeth, and all sides of their stems are grooved.

Spermacoce ocymoides
Burmam f.



S. ocymoides has a slender square stem with winged and scabrous angles. The leaves are oblong elliptical (15-30 x 5-12 mm), pale green and glabrous. The short stipular sheath (5 mm) has 5-7 small teeth. There are many small white to pink flowers that grow in non-spherical glomerules.

Spermacoce radiata
Sieber ex Hiern

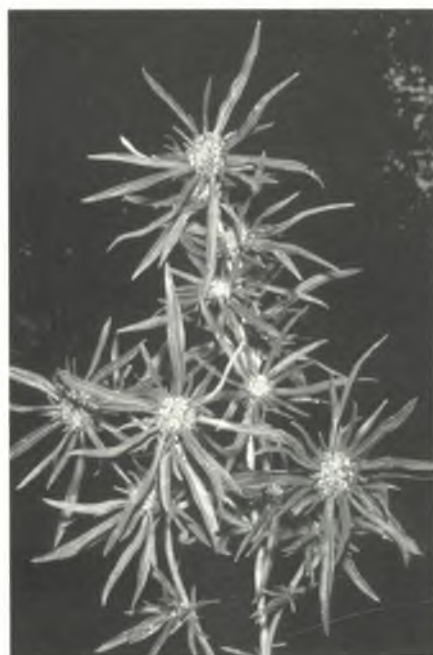


S. radiata is characterized by its white cartilaginous leaf margins and its pubescent stipular sheath with many teeth that are markedly longer than the base. The pubescent to hispid stem is round and somewhat reddish in colour. The lamina is linear (30-60 x 4-6 mm) and glabrous. The many small white flowers are sessile and form terminal or sub-terminal glomerules.

This species is quite common in degraded ferruginous soils of savanna regions.

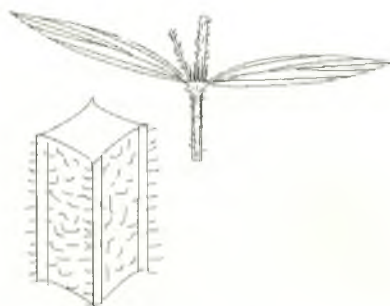


Spermacoce ocymoides.
Photo H. Merlier



Spermacoce radiata.
Photo H. Merlier

Spermacoce ruelliae DC.

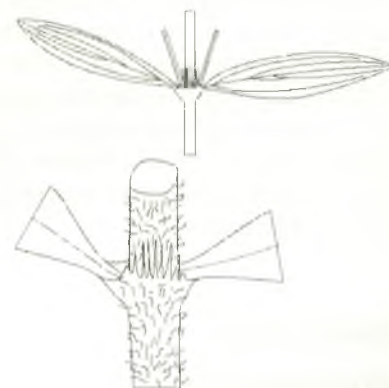


Spermacoce ruelliae.
Photo M. Déat

S. ruelliae grows abundantly in crop-fields of savanna regions. It has a square winged stem with scattered hairs. The leaves are linear-lanceolate (30-90 x 5-16 mm) and scabrous, and paler underneath as compared to the upper surface. The stipular sheath (10-14 mm) has 12-16 teeth (5-7 mm). The white flowers are supported by fine leaf bracts and form terminal and axillary glomerules. It is common throughout tropical Africa and prefers clay soils.

It is quite similar to *S. stachydea*, but can be distinguished by its stem shape.

Spermacoce stachydea
DC.



S. stachydea has an upright habit, and can grow up to 60 cm high. The square pubescent stem has rounded angles. The leaves have a linear lanceolate and densely scabrous lamina (30-90 x 7-20 mm). They have a short indistinct petiole, extended by a broad pubescent stipular sheath.

*Spermacoce stachydea*.

Photo T. Le Bourgeois

The sheath has many teeth that are ciliated at the apex. The flowers are arranged in false capitulae mixed with leaves.

S. stachydea and *S. ruelliae* are morphologically quite similar, but can be distinguished by their stems and leaves. *S. stachydea* has a round stem, more pubescent than that of *S. ruelliae*, which is square with winged angles. The leaves of *S. stachydea* are more scabrous than those of *S. ruelliae* and have a short petiole. In addition, the sheath teeth of *S. stachydea* are ciliated at the apex.

Spermacoce verticillata L.



S. verticillata can be identified by its leaves, which are arranged in pseudo-whorls, and by its highly branched and upright habit. The leaves are linear-lanceolate (30-50 x 5-10 mm) and glabrous. The short fine

stipular sheath has 5-7 teeth. The white flowers form small, dense axillary glomerules. This ruderal species flourishes in Sudano-Guinean climatic zones.

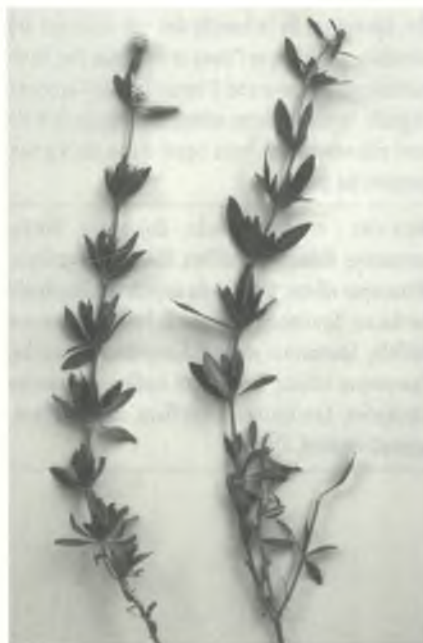
*Spermacoce verticillata*.

Photo M. Déat

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Abstract... Résumé... Resumen

J. SALAMERO, P. MARNOTTE, T. LE BOURGEOIS,
A. CARRARA — **Practical identification key for
14 Rubiaceae weed species of western and
central Africa.**

Some weeds of the Rubiaceae family have been identified in western and central Africa. An identification key was developed using eight plant structure characters. A table of these criteria and description of how to use the key are presented, without full plant descriptions.

Keywords : weed, Rubiaceae, *Diodia sarmentosa*, *Kohautia grandiflora*, *Kohautia senegalensis*, *Mitracarpus villosus*, *Oldenlandia corymbosa*, *Oldenlandia herbacea*, *Spermacoce chaetocephala*, *Spermacoce latifolia*, *Spermacoce octodon*, *Spermacoce ocymoides*, *Spermacoce radiata*, *Spermacoce ruelliae*, *Spermacoce stachydea*, *Spermacoce verticillata*, identification, plant structure, Africa.

J. SALAMERO, P. MARNOTTE, T. LE BOURGEOIS,
A. CARRARA — **Détermination pratique de
14 rubiacées, adventices d'Afrique de l'Ouest
et du Centre.**

Des adventices de la famille des rubiacées ont été identifiées en Afrique de l'Ouest et du Centre. Une clé de détermination comprend 8 caractères de l'appareil végétatif. Le tableau de ces critères, la démarche de la clé sont présentés, sans faire appel à une description complète des plantes.

Mots-clés : mauvaise herbe, Rubiaceae, *Diodia sarmentosa*, *Kohautia grandiflora*, *Kohautia senegalensis*, *Mitracarpus villosus*, *Oldenlandia corymbosa*, *Oldenlandia herbacea*, *Spermacoce chaetocephala*, *Spermacoce latifolia*, *Spermacoce octodon*, *Spermacoce ocymoides*, *Spermacoce radiata*, *Spermacoce ruelliae*, *Spermacoce stachydea*, *Spermacoce verticillata*, identification, appareil végétatif, Afrique.

J. SALAMERO, P. MARNOTTE, T. LE BOURGEOIS,
A. CARRARA — **Determinación práctica de
14 rubiacéas adventicias del África occidental
y central.**

Se han identificado adventicias de la familia de la rubiacéas en África occidental y central. Una clave de identificación incluye ocho caracteres del aparato vegetativo. Se presentan el cuadro de dichos criterios y el procedimiento de la clave sin recurrir a una descripción completa de las plantas.

Palabras clave : maleza, Rubiaceae, *Diodia sarmentosa*, *Kohautia grandiflora*, *Kohautia senegalensis*, *Mitracarpus villosus*, *Oldenlandia corymbosa*, *Oldenlandia herbacea*, *Spermacoce chaetocephala*, *Spermacoce latifolia*, *Spermacoce octodon*, *Spermacoce ocymoides*, *Spermacoce radiata*, *Spermacoce ruelliae*, *Spermacoce stachydea*, *Spermacoce verticillata*, identificación, aparato vegetativo, África.
