

**New *Sauropus* (Euphorbiaceae: Phyllanthae) taxa for the
Northern Territory and Western Australia and notes on other
Sauropus occurring in these regions**

John T. Hunter and Jeremy J. Bruhl

Department of Botany, University of New England, Armidale, New South Wales 2351, Australia

Abstract

Hunter, J.T. and Bruhl, J.J. New *Sauropus* (Euphorbiaceae: Phyllanthae) taxa for the Northern Territory and Western Australia and notes on other *Sauropus* occurring in these regions. Nuytsia 11(2): 165-184 (1997). Eight new species of *Sauropus* Blume are described and notes are provided on their distribution and conservation status: *S. arenosus*, *S. dunlopii*, *S. filicinus*, *S. gracilis*, *S. paucifolius*, *S. rimophilus*, *S. salignus*, and *S. torridus*. A new combination, *S. stenocladus* (Muell. Arg.) J.T. Hunter & J.J. Bruhl is made and a new subspecies, *S. stenocladus* subsp. *pinifolius*, is described. Notes and synonymy are provided for *S. trachyspermus* (F. Muell.) Airy Shaw. A key to all species and subspecies of *Sauropus* occurring within the Northern Territory and Western Australia is presented.

Introduction

The Australian species of *Sauropus* Blume (Euphorbiaceae: Phyllanthae) were originally included within *Synostemon* F. Muell. Airy Shaw (1980: 670), however, considered that *Synostemon* was "too close to *Sauropus*" and that the former could not be maintained as a separate genus.

There are 26 species of *Sauropus* in Australia. All species of *Sauropus* in Australia are endemic, except for *S. macranthus* Hassk., which is native to north east Queensland, New Guinea and the Pacific islands. We recognize 12 new species, four endemic to Queensland (see Hunter & Bruhl 1997), and eight restricted to the Northern Territory and/or Western Australia.

This paper presents full descriptions of the new *Sauropus* species we recognize within the Northern Territory and Western Australia. Nomenclatural notes are presented for *Sauropus trachyspermus*, a new combination is made with *S. stenocladus*, and a key to the species of *Sauropus* of this region is provided.

Methods

Sampling and Organization of Data. Significant proportions of the *Sauropus* specimens held by the herbaria AD, BRI, CANB, DNA, HO, MEL, NSW, PERTH and QRS, and historically important *Sauropus*

specimens from A and GH were provisionally sorted into taxa. Close inspection of these taxa and subsequent re-sorting of specimens formed the basis for our decisions on the status of these taxa. Ten representative specimens (where available) of these taxa were chosen for detailed analysis of quantitative micromorphological characters. Macromorphological characters (qualitative and quantitative, e.g. leaf length) were scored in all available material. Selection of the ten specimens for study was based on specimen quality in terms of the amount and number of developmental stages displayed.

A DELTA (Dallwitz 1980; Dallwitz *et al.* 1993) list of 395 characters and their states has been created by the authors for the Phyllanthaceae (Bruhl & Hunter unpublished). This was used to score attributes measured in selected specimens, together with those measured in all available material.

Fresh material was used where possible, but in most instances floral measurements were based on re-hydrated material. Mature leaves only were used for scoring leaf characters.

Terminology. For purposes of consistency across the members of the Phyllanthaceae, the perianth segments of *Sauropus* are referred to as sepals. Further developmental investigations need to be carried out to confirm this interpretation (Webster pers. comm.).

Terminology for seed surface characters follows that of Stearn (1992). A bordered hilum is indicated by a discoloured and often raised region surrounding the hilum. This character is most obvious in *Phyllanthus fuernrohrii* F. Muell. (see Hunter & Bruhl 1996, Figure 1A, C)

There are sometimes differences between the leaves of branches, referred to as 'branch leaves', and those on ultimate branchlets referred to as 'branchlet leaves'. Phyllanthoid branching is indicated by a reduction of the leaf that subtends a branch/branchlet to a scale-like structure, as illustrated by Webster (1970). Branch leaves exhibiting intermediate reduction in size, but still clearly laminate, are referred to as 'reduced'. Care should be taken where leaves may have fallen, to check for a leaf scar which will always be present.

Citation. Type specimens of all relevant taxa have been seen by one or both of the authors. Photographs of type specimens examined at BM and K are held at NE, together with photographs taken of type specimens on loan to NE.

A list of all specimens studied will be deposited at NE. An INTKEY dataset for interactive identification will be made available on completion of our study of the Australian Phyllanthaceae.

Taxonomy

1. *Sauropus arenosus* J.T. Hunter & J.J. Bruhl, *sp. nov.*

S. huntio similis sed stipulis ovatis, squamis brunneis, lamina acuta, sepalis masculinis libris, antheris brevioribus, stylis connatis differt.

Typus: sandhills E of Gregory Range, Western Australia, 21 May 1947, *R.D. Royce* 1873 (*holo:* PERTH: PERTH 01640712; *iso:* PERTH: PERTH 01640720, PERTH 01640747).

[*Sauropus huntii* auct. non (Ewart & Davies) Airy Shaw: J.W. Green, Census of the Vascular Plants of Western Australia. 108 (1985).]

Dioecious shrubs, 0.5-0.8 m tall. *Branchlets* rounded, 14-30 cm long, 1-4 mm wide, pilose to hirsute. *Stipules* persistent, free, 2.3-6 mm long, cream to yellow-brown, ovate to depressed ovate, glabrous to scabrous; base truncate to rounded; apex acuminate to acute; margins dentate to lacerate. *Branch leaves* scale-like, pallid-brown, glabrous to scabrous. *Leaves* alternate, distichous, jointed. *Petiole* 0.6-1.5 mm long, 0.7-1.8 mm wide, glabrescent or with persistent indumentum. *Lamina* usually asymmetrical, although a few may appear symmetrical, plane, but may appear twisted, 13.6-29.2 mm long, 5-15.4 mm wide, elliptic to ovate, mid-green, blue-green or grey-green, obscurely pinnately 4-6 veined per side, pilose to hirsute, spreading, sparse; base usually oblique, rounded to obtuse; apex erect, acuminate to acute, mucronate; margins plane, thickened (more so abaxially). *Bracts and bracteoles* persistent, glabrous. *Inflorescence* indeterminate, axillary, sessile. *Male flowers* 2-4 per cluster; pedicels 0.2-1 mm long, with indumentum; sepals 6, free, erect, 0.9-2.8 mm long, 0.5-1.4 mm wide, green, elliptic to obovate, rounded, obtuse to acute, fleshy, abaxially sparsely pilose; stamens 3, symmetrical, erect; filaments completely connate, erect, terete, 0.2-1 mm long; anthers erect, linear, 0.4-0.9 mm long, \pm apiculate, 0-0.1 mm long, cream; locules parallel. *Female flowers* solitary; pedicels at anthesis 0.8-2.5 mm long, 0.3-0.8 mm wide, in fruit 1.5-4.5 mm long, 0.3-1 mm wide, with indumentum; sepals free, 6, at anthesis erect to ascending, in fruit divergent to recurved, green, obtuse to acute, fleshy, abaxially spatially pilose to hirsute, 1.6-4.1 mm long, 0.9-2.3 mm wide, elliptic, ovate to obovate; styles well developed, 3, connate, notched, erect to recurved, green, 0.5-1.3 mm long, 0.2-0.6 mm wide, narrow-terete, glabrous to pilose, linear; ovary 1-2.8 mm long, 0.7-1.9 mm wide, ovoid to ellipsoid, smooth, puberulous. *Fruit* a septicidal capsule, ovoid to ellipsoid, 6.8-10 mm long, 5.5-8.5 mm wide, green, smooth, puberulous, pilose or hirsute, grooved septicidally; apex obtuse; column persistent, obconical, 5-9.2 mm long. *Seeds* yellow-brown, crescentiform, laterally compressed, 6-8 mm long, 1.5-3.5 mm wide, prominently ruminant; hilum slightly depressed, elliptic, more or less basal. (Figure 1A-C)

Selected specimens examined. WESTERN AUSTRALIA: Kimberley Division, small shrub on dune flank and crest, *T.J. Fatchen* 950 (AD); Kimberley Division, *T.J. Fatchen* 917 (AD); Great Sandy Desert, *J.S. Beard* 3231 (PERTH); 28 km SW of Well 35, Canning Stock Route, *A.S. George* 15657 (PERTH); just N of Tobin Lake, Great Sandy Desert, *A.S. George* 15593 (PERTH); 37 km SW of Gravity Lakes, Great Sandy Desert, *A.S. George* 15562 (PERTH); 14 km SW of Gravity Lakes, Great Sandy Desert, *A.S. George* 15558 (PERTH); Beyond the Mareo [?] Range, *Giles* (MEL).

Distribution. Restricted to the Canning region of Western Australia.

Habitat. Scrub and arid shrubland on red sand dunes.

Flowering and fruiting period. May.

Conservation status. CALM Conservation Codes for Western Australian Flora: Priority Three. A ROTAP code (Briggs & Leigh 1988) of 3VaW is suggested.

Etymology. The specific epithet refers to the restricted occurrence of *S. arenosus* on sand swales and dunes.

Notes. *Sauropus arenosus* is morphologically close to *S. huntii*, which it has been determined as in the past, but many characters can be used to separate them (Table 1).

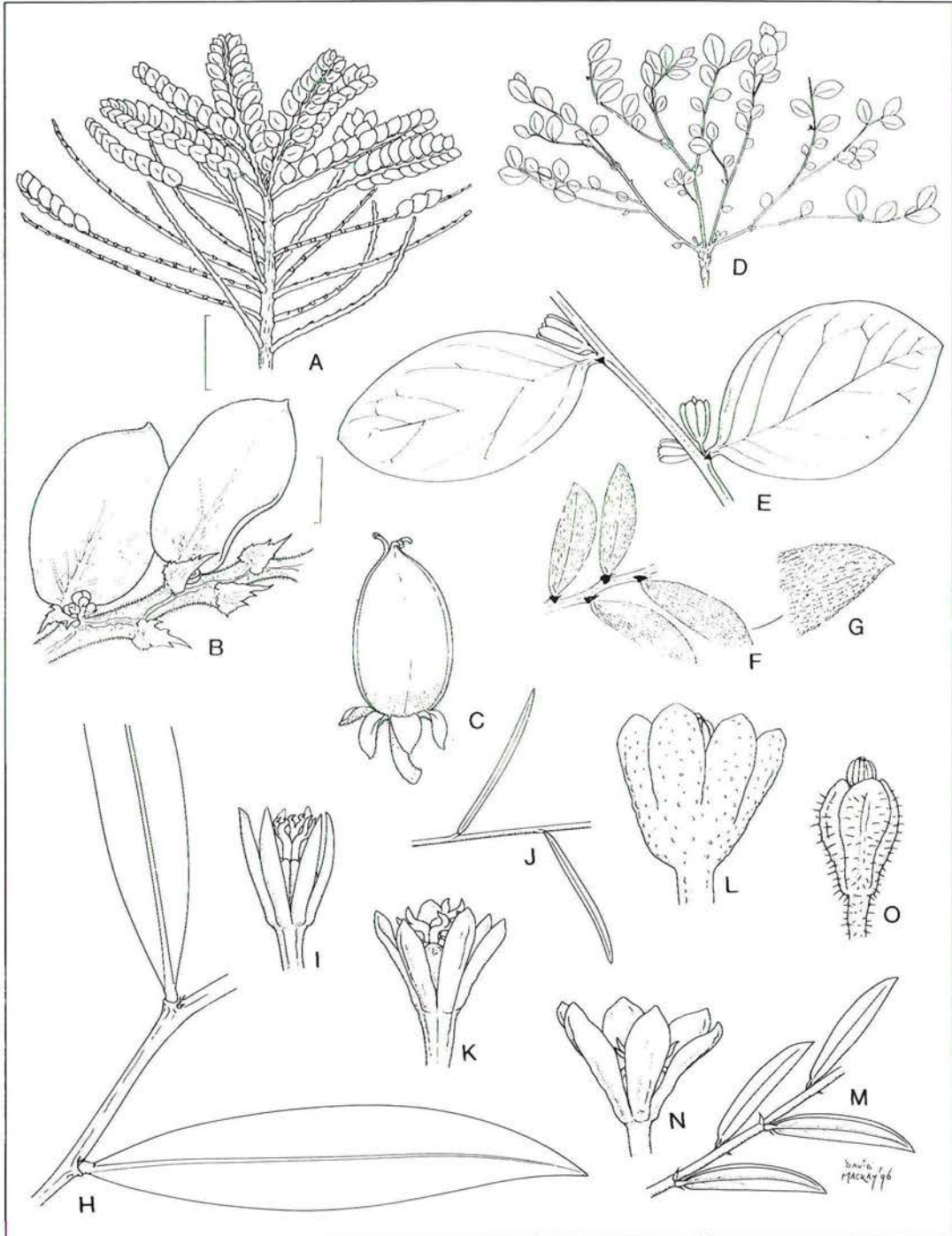


Figure 1. A-C *Sauropus arenosus* A - branch, B - branchlet, C - fruit; D-E *S. torridus* D - habit, E - flowering branchlet; F-G *S. elachophyllus* F - branchlet, G - leaf detail; H-I *S. glaucus* H - branchlet, I - female flower; J-K *S. stenocladus* subsp. *pinifolius* J - branchlet, K - female flower; L *S. stenocladus* subsp. *stenocladus* - male flower. M-O *S. dunlopianus* M - branchlet, N - female flower, O - male flower. Scale bars: A, D = 4 cm; B, E, F, H, J, M = 5 mm; C = 4 mm; G, I, K, N = 2 mm; L, O = 1 mm. Drawn from A.S. George 15558 (PERTH) (A,B); T.J. Fatchen 950 (AD) (C); K.F. Kenneally 7720 (PERTH) (D,E); M. Parris 9199 (CBG) (F,G); J.J. Bruhl 1281, J.T. Hunter & J.L. Egan (NE) (H); K.M. Manning 487 (DNA) (I); D. Bowman 179 & B. Wilson (DNA) (J); I.D. Cowie 1437 & C.R. Dunlop (DNA) (K); L.A. Craven 5701 (MEL) (L); J.T. Hunter 1579, J.J. Bruhl & J.L. Egan (NE) (M); J. Russell-Smith 4899 & Lucas (DNA) (N); J.T. Hunter 1575, J.J. Bruhl & J.L. Egan (NE) (O). Drawn by D. Mackay.

Table 1. Comparison of selected characters for *Sauropus arenosus* and *S. huntii*

	<i>S. arenosus</i>	<i>S. huntii</i>
Branch scales	Pallid brown	Green
Stipules	Ovate to depressed ovate	Triangular to narrowly so
Margins	Dentate to lacerate	Entire to erose
Branchlet leaves		
Apex	Acute to acuminate	Obtuse, rounded to obcordate
Margin	Thickened	Not thickened
Male sepals	Free	Connate
Shape	Elliptic to obovate	Circular, ovate to trullate
Anther length (mm)	0.4-0.9	1-2.6
Female pedicel length		
At anthesis (mm)	0.8-2.5	2-6.5
Length in fruit (mm)	1.5-4.5	2.8-8
Styles	Connate	Free
Division	Merely notched	Variably divided

2. *Sauropus dunlopii* J.T. Hunter & J.J. Bruhl, *sp. nov.*

S. glauco similis sed sepalis masculinis brevioribus, pedicello femineo brevioribus, antheris majoribus et seminibus brevioribus differt.

Typus: Kakadu National Park stage 3, Northern Territory, 20 April 1993, *J.T. Hunter* 1575, *J.J. Bruhl* & *J.L. Egan* (*holo*: DNA; *iso*: AD, BRI, CANB, DAV, K, L, NE, NSW).

Dioecious *shrubs*, 0.1-0.3 m tall. Branchlets persistent, rounded, ribbed, 2-12.5 cm long, 0.4-0.9 mm wide, hirsute. *Stipules* persistent, free, 0.4-0.9 mm long, cream, yellow-brown to red-brown, ovate, narrowly triangular or triangular, chartaceous, pilose; base truncate, rounded or obtuse; apex acuminate to acute; margins entire. *Branch leaves* normal, reduced or scale-like; scales red-brown, chartaceous, pilose. *Branchlet leaves* alternate, distichous, jointed, grey. *Petiole* 0.3-0.7 mm long, with persistent indumentum. *Lamina* asymmetrical, concave, 2.1-10 mm long, 0.8-3.2 mm wide, elliptic, oblong or oblanceolate, mid-green, concolourous, sub-coriaceous, often wrinkled, hirsute, base oblique, rounded to obtuse; apex erect, acute to obtuse, mucronate to apiculate; margins plane, thickened. *Bracts and bracteoles* persistent, with indumentum. *Inflorescence* indeterminate, axillary, sessile. *Male flowers* solitary; pedicels 0.5-1 mm long, with indumentum; sepals 6, shortly connate, erect to ascending, 0.8-1.6 mm long, 0.4-0.9 mm wide, yellow or green, obovate, rounded to obtuse, fleshy, pilose; stamens 3, 1-whorled, symmetrical, erect; filaments completely connate, erect, terete, 0.6-1.3 mm long; anthers

extrorse, erect, oblong to elliptic, 0.3-0.5 mm long, \pm apiculate, *c.* 0.1 mm long, red-brown; locules parallel. *Female flowers* solitary; pedicels at anthesis and in fruit 0.2-0.8 mm long, 0.3-0.5 mm wide, with indumentum; sepals free, 6, 1-1.4 mm long, 0.3-0.8 mm wide, ovate, green or yellow, rounded to obtuse, fleshy, hirsute; styles well developed, 3, free, divided to half way, erect, red, 0.4-0.7 mm long, 0.2-0.3 mm wide, narrow-terete, glabrous to pilose; style branches linear; stigmatic surface papillate; ovary 0.7-1.1 mm long, 0.9-1.4 mm wide, turbinate, smooth, pubescent. *Fruit* a septicial capsule, ovoid to ellipsoid, green, cartilaginous, smooth, pilose; column persistent, narrowly oblong. *Seeds* yellow-brown to red-brown, smooth, mature seeds not seen. (Figure 1M-O)

Specimens examined. NORTHERN TERRITORY: Coronation Hill, Kakadu National Park, *J.T. Hunter* 1565, *J.J. Bruhl* & *J.L. Egan* (NE); Kakadu National Park, stage 3, *J.T. Hunter* 1570, *J.J. Bruhl* & *J.L. Egan* (NE); Katherine Gorge National Park, sandstone plateau, *L.A. Craven* 6724 (DNA).

Distribution. This species is only known from Kakadu National Park and Katherine Gorge in the Northern Territory.

Habitat. Known from tropical woodland.

Flowering and fruiting period. April.

Conservation status. A ROTAP code (Briggs & Leigh 1988) of 2VC is suggested.

Etymology. In honour of Clyde Dunlop (DNA) who has contributed broadly to botanical knowledge, especially of the Top End of Australia.

Notes. *Sauropus dunlopii* grows low to the ground superficially resembling a fern, with grey-green leaves. It can be distinguished from *S. stenocladus* by the shorter male and female flower parts, the long filaments and short anthers, and its hairyness.

3. *Sauropus filicinus* J.T. Hunter & J.J. Bruhl, *sp. nov.*

S. rimophilo similis sed foliis ellipticis, sepalis masculinis brevioribus, pedicello femineo brevioribus, antheris brevioribus, et stylis libris differt.

Typus: Kakadu National Park [precise locality withheld], Northern Territory, April 1993, *J.T. Hunter* 1588, *J.J. Bruhl* & *J.L. Egan* (*holo:* DNA: we designate one of several unmounted specimens by our tag "holo of *Sauropus filicinus*"; *iso:* CANB, NE).

Dioecious dwarf pendulous *shrubs*. *Branchlets* rounded, 8-24 cm long, 0.4-0.5 mm wide, glabrous to sparsely puberulous. *Stipules* persistent, free, 0.4-0.7 mm long, red-brown to red, triangular, glabrous to puberulous; base truncate, rounded, to obtuse; apex acuminate to acute; margins entire. *Branch leaves* scale-like, red-brown, glabrous to puberulous. *Branchlet leaves* alternate, distichous, jointed, brown when dry or remaining green. *Petiole* 0.2-0.8 mm long, 0.3-0.4 mm wide, glabrous or with indumentum. *Lamina* symmetrical or slightly asymmetrical with one side of the mid-vein wider than the other, plane or rarely concave, 7-12 mm long, 3.9-9.1 mm wide, elliptic, circular to ovate, light-green to dark-green, paler below, pinnately 3-9 veined per side, glabrous to densely puberulous; base oblique, rounded to obtuse; apex erect, acute, obtuse to rounded, mucronate or appearing apiculate in some; margins entire, plane, \pm thickened (more noticeable on the abaxial surface when occurring). *Bracts and*

bracteoles persistent, glabrous or with indumentum. *Inflorescence* indeterminate, axillary, sessile. *Male flowers* 3-15 per cluster; pedicels 0.6-1.2 mm long, glabrous or with indumentum; sepals 6, shortly connate, erect to ascending, lobes 0.4-0.9 mm long, 0.6-0.9 mm wide, green to pink, elliptic, glabrous to sparsely abaxially puberulous; apex rounded; stamens 3, symmetrical, erect; filaments completely connate, erect, terete, 0.4-0.6 mm long; anthers extrorse, erect, elliptic, 0.5-0.6 mm long; apiculum *c.* 0.1 mm long, red-brown; locules parallel. *Female flowers* solitary; pedicels at anthesis and in fruit 0.3-0.8 mm long, 0.2-0.4 mm wide, glabrous or with indumentum; sepals free, 6, at anthesis erect to ascending, in fruit divergent, reflexed or recurved, rounded to obtuse, fleshy, glabrous to abaxially puberulous, 0.8-1.4 mm long, 0.1-1.1 mm wide, obovate to obtrullate; styles well developed, 3, free, divided for about half their length, divergent with lobes erect, red to pink, 0.7-1 mm long, *c.* 0.4 mm wide, clavate, glabrous; branches linear; ovary 0.7-0.8 mm long, 1-1.3 mm wide, ovoid, ellipsoid, to globose, colliculate, glabrous. *Fruit* a septicial capsule, ellipsoid, with \pm observable venation, 5.5-7.5 mm long, 4-5 mm wide, red-brown, green or grey, smooth, glabrous to puberulous; apex rounded; column persistent, angular-ovoid to narrow oblong, *c.* 5 mm long. *Seeds* red-brown, crescentiform, laterally compressed, 5.2-6 mm long, 1.8-2.3 mm wide, smooth, winged; hilum slightly depressed but very elongated, taking up much of the length of the seed, oblanceolate, cavity more or less central.

Specimens examined. NORTHERN TERRITORY: Darwin & Gulf: East Alligator River, *Byrnes* 2719 (BRI).

Distribution. Both collections seen of this species come from Kakadu National Park in the Northern Territory.

Habitat. *Sauropus filicinus* grows pendulously from the crevices of sandstone cliffs.

Flowering and fruiting period. Flowering specimens have been collected in April and August. Fruiting specimens have only been collected in April.

Conservation status. A ROTAP code (Briggs & Leigh 1988) of 2ECTY is suggested.

Etymology. In reference to the fern-like appearance and habit.

Notes. *Sauropus filicinus* is morphologically close to *S. rimophilus* but differs in habit and in having longer sepals, and shorter pedicels, anthers and seeds (Table 2). Plants are variously glabrous to very hairy; our collection from one population included individuals that were glabrous or with a distinct indumentum.

4. *Sauropus gracilis* J.T. Hunter & J.J. Bruhl, *sp. nov.*

S. glauco similis sed planta monoecia, pedicello masculino longiore, filamentis brevioribus, et sepalis femineis longioribus differt.

Typus: Arnhem Land, [precise locality withheld], Northern Territory, *K. Brennan* 2283 (*holo:* DNA; *iso:* CBG, NE, OSS: OSS9495, PERTH).

Monoecious *perennial plants*. *Branchlets* persistent, rounded, 12-24 cm long, 0.3-0.4 mm wide, glabrous. *Stipules* persistent, free, 0.5-0.8 mm long, yellow-brown to red-brown, triangular, membranous, glabrous; base truncate to rounded; apex acuminate to acute; margins entire. *Branch leaves* scale-like, yellow to pallid-brown, glabrous. *Branchlet leaves* alternate, distichous, jointed. *Petiole* 0.3-0.6 mm

long, 0.2-0.4 mm wide, glabrous. *Lamina* symmetrical to slightly asymmetrical, concave, 9.5-12 mm long, 1.4-3.4 mm wide, elliptic to oblanceolate, grey-green, paler below, obscurely pinnately veined, glabrous; base oblique, rounded; apex erect, acuminate to acute, mucronate; margins thickened, sometimes only slightly so. *Bracts and bracteoles* persistent, glabrous. *Inflorescence* unisexual or sometimes bisexual with the sexes mixed, indeterminate, axillary, sessile. *Male flowers* 2-3 per cluster; pedicels 1.8-3.2 mm long, glabrous; sepals 6, connate for half their length or less, erect and ascending, 1.2-1.9 mm long, 0.7-1.2 mm wide, green, elliptic to ovate, obtuse to acute, glabrous; stamens 3, symmetrical, erect; filaments completely connate, erect, terete, 0.3-0.4 mm long; anthers extrorse, erect, oblong to linear, 1-1.1 mm long; apiculum 0.05-0.15 mm long, red-brown; locules parallel. *Female flowers* solitary; pedicels at anthesis and in fruit 0.7-1 mm long, 0.2-0.3 mm wide; sepals 6, persistent, free, at anthesis erect to ascending, in fruit divergent to reflexed, red-brown or green, fleshy, glabrous; apex rounded to obtuse; 1.3-1.8 mm long, 0.4-0.8 mm wide, somewhat keeled; styles well developed, 3, free, divided for much less than half their length, erect, ascending to divergent, green, 1-1.1 mm long, 0.2-0.3 mm wide, narrow-terete to obloid, glabrous; style branches linear; ovary 0.6-1 mm long, 0.7-0.8 mm wide, ovoid to ellipsoid, smooth, glabrous. *Fruit* septicidal capsule, explosive, ovoid to ellipsoid, 5-6 mm long, 4.5-6 mm wide, green to grey, smooth, glabrous, grooved septicidally; apex rounded to obtuse; column persistent, 'lanceolate', 3.5-3.8 mm long. *Seeds* yellow-brown, crescentiform, laterally compressed, 4.6-5 mm long, 1.7-2 mm wide, smooth, winged; hilum slightly depressed, elliptic, cavity more or less central.

Distribution. Known only from the type locality within Arnhem Land, Northern Territory.

Habitat. Found growing in crevices in sandstone cliffs.

Conservation status. A ROTAP code (Briggs & Leigh 1988) of 1EY is given.

Etymology. The specific epithet refers to the delicate habit of the plants of this species.

Notes. The description of *Sauropus gracilis* is based on a single collection, therefore, the quantitative attributes presented should be viewed accordingly.

5. *Sauropus paucifolius* J.T. Hunter & J.J. Bruhl, *sp. nov.*

S. ochrophylo affinis sed stipulis connatis, foliis magnis paucioribus, et ramulis angularibus differt.

Typus: 5 miles [8 km] north-west of Humpty Doo, Northern Territory, 11 November 1971, J.L. McKean B43 (*holo:* DNA: DNA 4154 ["2ND SHEET": branched specimen, right hand specimen with males and females]; *iso:* DNA: DNA 4154).

Sauropus sp. 'Darwin', Dunlop *et al.*, Flora of the Darwin Region 2: 235 (1995).

Monoecious or dioecious *perennial plants*, 0.2-0.5 m tall. *Branchlets* persistent, angular, mainly monopodial, ribbed, photosynthetic, 4-5.5 cm long, 0.5-2.1 mm wide, glabrous or papillose. *Stipules* persistent, free or connate, sometimes fused to leaf scales, 0.9-2.7 mm long, yellow-brown to red-brown, ovate to triangular, glabrous; base truncate, rounded to obtuse; apex acuminate to acute; margins lacerate to erose. *Branch leaves* scale-like but occasionally normal, scales pallid-brown to red-brown, glabrous. *Branchlet leaves* alternate, distichous, jointed, remaining green. *Petiole* 0.5-2 mm long, 0.5-1.2 mm wide, thickened, glabrous. *Lamina* symmetrical, convex or plane, 21.5-63.8 mm long, 10-25 mm wide, linear, elliptic, lanceolate, obovate or oblanceolate, light-green to mid-green, paler below,

obscurely pinnately 4-10 veined per side; base slightly oblique to symmetrical, rounded to obtuse; apex erect, acuminate, acute, to obtuse, mucronate to apiculate; margins entire, plane to revolute, thickened. *Bracts and bracteoles* deciduous, glabrous. *Inflorescence* unisexual with males and females often on different branches, indeterminate, axillary, sessile. *Male flowers* 2-12 per cluster; pedicels 1-3.5 mm long, glabrous; sepals 6, free, erect to ascending, 1.4-5.2 mm long, 0.6-2.4 mm wide, yellow, yellow-brown or green and sometimes tinged with purple, elliptic, lanceolate to ovate, fleshy, glabrous; apex retuse, rounded, obtuse to acute; stamens 3, symmetrical, erect; filaments completely connate, erect, terete, 0.3-1 mm long; anthers extrorse, erect, oblong to elliptic, 0.6-1 mm long; apiculum 0.5-2 mm long, cream; locules parallel to divergent. *Female flowers* 1-2 per cluster; pedicels at anthesis 1.5-7.5 mm long, 0.1-0.5 mm wide, in fruit 4-12 mm long, 0.3-0.7 mm wide, glabrous; sepals 6, persistent, free, at anthesis erect to ascending, in fruit divergent to reflexed, yellow-brown, green or yellow and sometimes tinged with purple, fleshy, glabrous; apex rounded, obtuse to acute, 1.4-4.1 mm long, 0.7-2.4 mm wide, elliptic, lanceolate to ovate; styles well developed, 3, free, divided for much less than half their length, ascending to divergent, yellow, red or green, 0.4-1.4 mm long, 0.1-0.3 mm wide, narrow-terete to obloid, glabrous; style branches linear and oblong; ovary 0.5-1.6 mm long, 0.5-1.9 mm wide, ovoid to ellipsoid, smooth, glabrous. *Fruit* a septicidal capsule, explosive, ovoid to ellipsoid, 5-8.5 mm long, 6.5-8.2 mm wide, green, smooth, glabrous, grooved septicidally; apex rounded to obtuse; column persistent, rhomboid to 'lanceolate', 3.6-4.1 mm long. *Seeds* yellow-brown, crescentiform, laterally compressed, 7-8 mm long, 2-2.5 mm wide, smooth; hilum slightly depressed, elliptic, cavity more or less central.

Selected specimens examined. NORTHERN TERRITORY: Kapalga CSIRO Research Station, J.T. Hunter 1591, J.J. Bruhl & J.L. Egan (NE); 5 miles [8 km] NW of Humpty Doo, 11 Nov. 1971, J.L. McKean s.n. (DNA); Mount Bundy, C.R. Dunlop 8764 & I.D. Cowie (DNA); Bees Creek Rd, G.M. Wightman 1794 (DNA); UDP Falls near El Sharana, J.L. McKean & M. Jagoe G876 (DNA); 13 km E of Howard Springs, P.I. Forster 5916 (BRI); Berry Springs, P.I. Forster 5917 (BRI); Darwin, S.T. Blake 17314 (BRI); Arnhem Hwy, 20 km W of West Alligator River, G.M. Wightman 3108 (BRI); 10 km S Cannon Hill, Kakadu National Park, J. Russell-Smith 844 (DNA).

Distribution. This species has been collected from Darwin to Katherine in the Northern Territory.

Habitat. *Sauropus paucifolius* is apparently widespread and abundant on sandy soils in woodland, however it has rarely been collected.

Flowering and fruiting period. October to January.

Etymology. In reference to the small number of leaves on each plant, typically 0-3.

Notes. *Sauropus paucifolius* is easily identified, due to its strongly ribbed, typically monopodial stems usually with only one or a few large leaves towards the base of the stems.

6. *Sauropus rimophilus* J.T. Hunter & J.J. Bruhl, *sp. nov.*

S. filicino similis sed sepalis masculinis majoribus obovatis, pedicello femineo longiore, antheris longioribus, et stylis connatis differt.

Typus: Kambolgie Creek camp, Northern Territory, 19 April 1993, J.T. Hunter 1246, J.J. Bruhl & J.L. Egan (*holo:* DNA; *iso:* BRI, CANB, DAV, MO, NE).

Dioecious shrubs to 1.5 m tall. *Branchlets* persistent 9-23.5 cm long, 0.4-1.1 mm wide, glabrous to sparsely hirsute. *Stipules* persistent, 0.5-1.2 mm long, red-brown to red, triangular, glabrous to puberulous; base rounded to obtuse; apex acute; margins entire. *Branch leaves* scale-like, red-brown, glabrous to puberulous. *Branchlet leaves* alternate, distichous, jointed, brown when dry or remaining green. *Petiole* present, 0.6-1.6 mm long, 0.2-0.7 mm wide, glabrous or hairy. *Lamina* asymmetrical, convex to plane, 4.8-16.5 mm long, 4.4-19.2 mm wide, elliptic, circular, ovate, rhombic, oblanceolate to transversely elliptic, mid-green to dark-green, paler below, obscurely pinnately 4-7 veined per side, glabrous to sparsely hirsute; base oblique, truncate, rounded or obtuse; apex erect, acute, obtuse, rounded or emarginate, mucronate to apiculate; margins plane. *Bracts and bracteoles* persistent, glabrous. *Inflorescence* indeterminate, axillary, sessile. *Male flowers* 1-4 per cluster; pedicels 0.6-2.6 mm long; sepals erect to ascending, 1.3-3.3 mm long, red-brown to green, obovate, fleshy, sparsely scabrous to pilose abaxially; apex sometimes appearing clawed, truncate, rounded, obtuse, to acute rarely emarginate or apiculate; stamens 3, symmetrical, erect; filaments completely connate, erect, terete, 0.4-1.3 mm long; anthers extrorse, erect, linear to narrowly elliptic, 1.2-1.7 mm long; apiculum 0.1-0.3 mm long, red-brown; locules parallel. *Female flowers* solitary; pedicels at anthesis 0.5-1.2 mm long, 0.3-0.5 mm wide, in fruit 1-1.6 mm long, 0.4-0.6 mm wide, with indumentum; sepals persistent, 6, free, erect to ascending, in fruit divergent to reflexed, green, obtuse to acute, fleshy, sparsely scabrous to pilose abaxially, at anthesis 1.4-3.9 mm long, 1-2 mm wide, obovate to obtusulate, sometimes clawed; styles well developed, 3, connate, divided for about half their length or more, ascending, red to pink, 1-1.5 mm long, 0.2-0.4 mm wide, narrow-terete, glabrous to papillose; style branches linear; stigmatic surface papillate; ovary 1.2-1.6 mm long, 1-1.4 mm wide, ovoid to globose, smooth, puberulous to pubescent. *Fruit* a septicidal capsule, ovoid to ellipsoid, 7.2-9.4 mm long, 5.5-6.5 mm wide, yellow-brown, smooth, puberulous, pubescent to pilose, grooved septicidally; apex obtuse to acute; column persistent, narrow oblong to oblanceolate, 6.8-8 mm long. *Seeds* yellow-brown to orange, crescentiform, laterally compressed, 6.8-9 mm long, 1.5-2.7 mm wide, smooth, with a small wing; hilum slightly depressed, oblanceolate, cavity more or less central extending most of the seed length.

Selected specimens examined. NORTHERN TERRITORY: Kambolgie Creek camp, *J.T. Hunter* 1246, *J.J. Bruhl* & *J.L. Egan* (NE); Twin Falls, *C. Dunlop* 6212 & *J. Taylor* (DNA); Kakadu National Park, Deaf Adder Creek Gorge, *I.R. Telford* 7977 & *J.W. Wrigley* (CBG); Kakadu National Park, 6 km SW of Mt Brockman, *I.R. Telford* 8063A & *J.W. Wrigley* (CBG); Kakadu National Park, 1 km E of East Alligator River Crossing OenPELLI road at Obiri rock turn-off, *I.R. Telford* 7612 & *J.N. Wrigley* (CBG); Kakadu National Park, 8 km NNE of Mt Evelyn, *K.A. Menkhorst* 314 (DNA); c. 70 km S of Jabiru, *L.A. Craven* & *G. Whitbread* 7673 (MEL); Kakadu National Park, Upper Koolpin Creek, *Russell-Smith* 5518A & *Lucas* (DNA).

Distribution. *Sauropus rimophilus* is known to occur from Jabiru in Kakadu National Park to Upper Katherine, Northern Territory.

Habitat. This species grows perpendicularly then pendulously from cracks and crevices on more or less vertical faces of the sandstone escarpment.

Flowering and fruiting period. Flowering March, April, and June and fruiting March and April according to herbarium specimens and our observations.

Conservation codes. A ROTAP code (Briggs & Leigh 1988) of 2EC-Y is suggested.

Etymology. The specific epithet alludes to the occurrence of this species in crevices of sandstone escarpments

Table 2. Comparison of selected characters for *Sauropus filicinus* and *S. rimophilus* (measurements in mm)

	<i>S. filicinus</i>	<i>S. rimophilus</i>
Male sepal shape	Elliptic	Obovate
Male sepal length	0.4-0.9	1.3-3.3
Anther length	0.5-0.6	1.2-1.7
Female pedicel length in fruit	0.5-0.7	1-1.6
Styles	Free	Connate
Ovary length	0.7-0.8	1.2-1.6
Fruit width	4-5	5.5-6.5
Seed length	5.2-6	6.8-9

Notes. *Sauropus rimophilus* appears to be morphologically similar to *S. filicinus*. Both species are restricted to sandstone cliffs in the Kakadu area. The former however, is larger in most floral parts and has connate styles (Table 2).

7. *Sauropus salignus* J.T. Hunter & J.J. Bruhl, *sp. nov.*

S. stenoclado subsp. *pinifolio* similis sed caulibus angularibus, foliis latioribus, sepalis masculinis libris, filamentis longioribus, et antheris brevioribus differt

Typus: Osborne Island, Bonaparte Archipelago, Western Australia, 28 June 1973, P.G. Wilson 11107 (*holo:* PERTH: PERTH 01641840).

Sauropus sp. B, Wheeler *et al.*, Flora of the Kimberley Region 628 (1995).

Monoecious *shrubs*. *Branchlets* angular, ribbed, 8-15.5 cm long, 0.4-0.6 mm wide. *Stipules* persistent, free, 1-7 mm long, narrowly triangular to triangular, glabrous; base truncate to rounded; apex acuminate to acute; margins entire. *Branch leaves* scale-like, yellow, pallid-brown, to green, glabrous. *Branchlet leaves* alternate, distichous, jointed. *Petiole* 0.6-1 mm long, 0.2-0.4 mm wide, glabrous. *Lamina* symmetrical, concave to plane, 10.6-15.7 mm long, 4.9-8 mm wide, elliptic and obovate, light-green to mid-green, paler below, obscurely pinnately veined, glabrous; base oblique, obtuse to cordate; apex erect, acute to obtuse, mucous to apiculate; margins plane. *Bracts and bracteoles* deciduous, glabrous. *Inflorescence* unisexual or sometimes bisexual with distal females, determinate, axillary. *Male flowers* 1-4 per cluster; pedicels 0.5-1 mm long, glabrous; sepals 6, free, erect to ascending, 0.6-1.1 mm long, 0.5-0.9 mm wide, white or yellow or green, elliptic, ovate to obovate, rounded, obtuse to acute, glabrous; stamens 3, symmetrical, erect; filaments connate most of their length or completely connate, erect, terete, 0.6-1 mm long; anthers extrorse, erect to divaricate, oblong to elliptic, 0.2-0.4 mm long, not apiculate; locules parallel. *Female flowers* solitary; pedicels jointed, at anthesis 0.7-1.5 mm long, 0.1-0.2 mm wide, in fruit 1-2.1 mm long, 0.2-0.3 mm wide, glabrous; sepals 6, persistent, free, at anthesis erect to ascending, in fruit divergent to reflexed, white, green or yellow, obtuse to acute, glabrous, 1.1-2 mm long, 0.4-1 mm wide, elliptic to obovate; styles well developed, 3, free, divided for much less than half their length, erect

to ascending, yellow to green, 0.3-0.5 mm long, 0.1-0.2 mm wide, narrow-terete, glabrous; style branches linear; stigmatic surface papillate; ovary 0.7-0.9 mm long, 0.7-0.9 mm wide, ovoid to ellipsoid, smooth, glabrous. *Fruit* a septicidal capsule, explosive, ovoid to ellipsoid, 3.5-4 mm long, 4-5.2 mm wide, green, smooth, glabrous, grooved septicidally; apex rounded to obtuse; column persistent, rhomboid to 'lanceolate', 1.5-2 mm long. *Seeds* red-brown, crescentiform, laterally compressed, 2.9-3.6 mm long, 1.4-2.1 mm wide, smooth; hilum slightly depressed, not bordered, elliptic, cavity more or less central.

Specimens examined. WESTERN AUSTRALIA: 2.5 km N of Face Point, Carson Escarpment, G.J. Keighery 10668 (PERTH); Osborne Island, Bonaparte Archipelago, P.G. Wilson 11107 (PERTH).

Distribution. Only collected from the Carson Escarpment and Osborne Island in the Kimberley region of Western Australia.

Conservation codes. CALM Conservation Codes for Western Australian Flora: Priority One. A ROTAP code (Briggs & Leigh 1988) of 2E is suggested.

Etymology. The specific epithet refers to the weeping willow-like habit of this species.

8. *Sauropus stenocladus* (Muell. Arg.) J.T. Hunter & J.J. Bruhl, *comb. nov.*

Phyllanthus stenocladus Muell. Arg., Flora oder Allgemeine Botanische Zeitung 47: 536 (1864). *Type:* Port Essington, Northern Territory, Armstrong 503 (*holo:* K).

Notes. Airy Shaw (1980) transferred the Australian species of *Synostemon* to *Sauropus*. He treated *Phyllanthus stenocladus* as a synonym of *Sauropus glaucus*. The type of *P. stenocladus* does not conform to the type or description of *S. glaucus*. We therefore recognize *P. stenocladus* as a distinct species and transfer it to *Sauropus*, and recognize a new subspecies. The autonym has priority over the three taxonomic synonyms listed below.

8a. *Sauropus stenocladus* (Muell. Arg.) J.T. Hunter & J.J. Bruhl subsp. *stenocladus*

Phyllanthus lissocarpus S. Moore, J. Linn. Soc. (Botany). 45: 215 (1920); *Sauropus lissocarpus* (S. Moore) Airy Shaw, Kew Bull. 35: 680 (1980). *Type:* Groote Eylandt [Northern Territory], s.d., R. Brown 3606 (*holo:* BM).

Sauropus glaucus var. *glaber* Airy Shaw, Kew Bull. 35: 676 (1980). *Type:* Doingi airstrip [Northern Territory], 23 June 1972, J. Must 1050 (*holo:* K).

Sauropus latzii Airy Shaw, Kew Bull. 35: 680 (1980). *Type:* Wessel Islands, rare in lateritic gravel, 1 Oct[ober] 1972, Latz 3362 (*holo:* K; *iso:* DNA).

Dioecious *shrubs*, 0.3-1 m tall. Branchlets persistent, rounded to ellipsoid, ribbed, 2.2-17 cm long, 0.4-0.6 mm wide, glabrous or rarely scabrous to hirsute. *Stipules* persistent, free, 0.5-1.2 mm long, yellow-brown to red-brown, ovate to triangular, chartaceous, glabrous; base truncate, rounded or obtuse; apex acuminate to acute; margins entire. *Branch leaves* normal, reduced or scale-like, red-brown, chartaceous, glabrous. *Branchlet leaves* alternate, distichous. *Petiole* 0.1-0.6 mm long, glabrous. *Lamina* asymmetrical, concave, 5.5-18.5 mm long, 0.6-2.4 mm wide, linear to elliptic, grey-green, concolourous,

sub-coriaceous, wrinkled, glabrous; base oblique, rounded to obtuse; apex erect, acute to obtuse, mucronate to apiculate; margins revolute to plane, thickened. *Bracts and bracteoles* persistent, glabrous. *Inflorescence* indeterminate, axillary, sessile. *Male flowers* 1-6 per cluster; pedicels 0.5-1.5 mm long, glabrous; sepals 6, shortly connate to connate for half their length, erect, 2-2.6 mm long, 0.5-1 mm wide, yellow, linear, obovate or oblanceolate, rounded to obtuse, fleshy, glabrous; stamens 3, 1 whorled, symmetrical, erect; filaments completely connate, erect, terete, 0.8-1 mm long; anthers extrorse, erect, oblong to linear, 1.1-1.5 mm long; apiculum 0.1-0.4 mm long, red-brown; locules parallel. *Female flowers* solitary, pedicels at anthesis and in fruit 1-2.2 mm long, 0.3-0.6 mm wide, distally dilated, glabrous; sepals free, 6, 2-3.2 mm long, 0.7-1.4 mm wide, obovate to oblanceolate, yellow, rounded to obtuse, fleshy, glabrous; styles well developed, 3, free, divided about half way or more, erect to divergent, red, 0.8-1.3 mm long, 0.2-0.4 mm wide, narrow-terete, glabrous; style branches linear; stigmatic surface papillate; ovary 0.8-1.3 mm long, 1-1.4 mm wide, turbinate, smooth, glabrous. *Fruit* a septicidal capsule, explosive, ovoid to ellipsoid, 4.8-5.6 mm long, 4-5.5 mm wide, green, cartilaginous, smooth, glabrous; column persistent, narrow oblong, 3.7-4.5 mm long. *Seeds* yellow-brown to red-brown, crescentiform, laterally compressed, 4.8-5.2 mm long, 2.5-3 mm wide, smooth, winged; hilum slightly depressed, not bordered, oblanceolate, cavity more or less basal. (Figure 1L)

Selected specimens examined. NORTHERN TERRITORY: Port Essington, *Holtz s.n.* (MEL 1003725); Nabungwa, Groote Eylandt, *J. Waddy* 647 (DNA); on Katherine road, 4 km past Giddy River Crossing, 31 km from Gove Airport, 19 Nov 1989, *P.I. Forster s.n.* (BRI); Gove Road, 7.6 km S Dahlinbuy, turn-off, *M.J. Clark* 1544 (DNA); 22 km W of Liverpool river on the Oenpelli Rd, *M.J. Clark* 1139 (DNA).

Distribution. From Darwin to Groote Eylandt in the Gulf of Carpentaria, Northern Territory.

Habitat. Known from tropical woodland.

Flowering and fruiting period. January to December.

Notes. This subspecies can be distinguished from subspecies *pinifolius* by its wider leaves and smooth rather than viscid or crustaceous appearance. Specimens of *Sauropus stenocladus* have been misidentified as *S. elachophyllus*, a north Queensland species, but the two can be distinguished, *inter alia*, by the smooth leaves of the former (Figure 1J) and the wrinkled (when dry) leaves of the latter. (Figure 1F-G)

8b. *Sauropus stenocladus* subsp. *pinifolius* J.T. Hunter & J.J. Bruhl, *subsp. nov.*

A subsp. *stenocladus* differt planta distincte viscida, foliis multo angustioribus et ramulis costatis.

Typus: Litchfield National Park, above Florence Falls, Northern Territory, 24 April 1993, *J.J. Bruhl* 1278 & *J.L. Egan* (*holo:* DNA; *iso:* NE).

Monoecious *shrubs*, 0.2-0.6 m tall, plant viscid and turning crustaceous on drying giving a warty or scabrous appearance. *Branchlets* rounded to ellipsoid, ribbed, 4-22 cm long, 0.4-1 mm wide, glabrous. *Stipules* persistent, free, 0.3-1.2 mm long, yellow-brown, red-brown or red, ovate, narrowly triangular or triangular, chartaceous, glabrous; base truncate, rounded or obtuse; apex acuminate to acute; margins entire. *Branch leaves* scale-like, pallid-brown to red-brown, chartaceous. *Branchlet leaves* alternate, distichous, jointed, grey. *Petiole* 0.2-0.6 mm long, glabrous. *Lamina* asymmetrical, concave, 3.5-16 mm

long, 0.3-1.6 mm wide, linear, concolourous, sub-coriaceous, glabrous; base oblique, rounded to obtuse; apex erect, acuminate, acute or obtuse, mucronate to apiculate, often bent to one side; margins revolute or plane, thickened. *Bracts* and *bracteoles* persistent, glabrous. *Inflorescence* with males and females on different branches, indeterminate, axillary, sessile. *Male flowers* 1-4 per cluster; pedicels 0.2-1.3 mm long, glabrous; sepals 6, shortly connate to connate for half their length, erect, 0.8-2 mm long, 0.4-0.9 mm wide, white or red-brown, linear to oblanceolate, rounded, obtuse or acute, fleshy, glabrous; stamens 3, 1 whorled, symmetrical, erect; filaments completely connate, erect, terete, 0.1-0.5 mm long; anthers extrorse, erect, oblong to linear, 0.8-1 mm long, \pm apiculate, 0-0.1 mm long, red-brown; locules parallel. *Female flowers* solitary; pedicels at anthesis and in fruit 1-6 mm long, 0.4-0.6 mm wide, glabrous; sepals free, 6, 1.8-3.2 mm long, 0.5-1 mm wide, linear to oblanceolate, red-brown or yellow, rounded, obtuse or acute, fleshy, glabrous; styles well developed, 3, free, divided half way or more, erect or divergent, red or green, 0.7-1.4 mm long, 0.2-0.6 mm wide, narrow-terete, glabrous; style branches linear; stigmatic surface papillate; ovary 0.8-1.5 mm long, 0.8-1.4 mm wide, turbinate, smooth, glabrous. *Fruit* a septicidal capsule, explosive, ovoid to ellipsoid, 8-9.5 mm long, 7-8.5 mm wide, green, cartilaginous, smooth, glabrous; column persistent, narrow oblong, 7.5-8.5 mm long. *Seeds* yellow-brown or red-brown, crescentiform, laterally compressed, 8-9 mm long, 2.5-2.8 mm wide, smooth, winged; hilum slightly depressed, not bordered, oblanceolate, cavity more or less basal. (Figure 1J-K)

Selected specimens examined. NORTHERN TERRITORY: Litchfield National Park, above Florence Falls, J.J. Bruhl 1278 & J.L. Egan (NE); Litchfield National Park, track to lost city, I.D. Cowie 1437 & C.R. Dunlop (DNA); 10 km SE of Nourlangie Ranger Station, Pine Creek road, L.A. Craven 5701 (DNA); Jim Jim Creek, C. Dunlop 6200 & J. Taylor (NSW); Stapleton Park, D. Bowman 179 & B. Wilson (DNA); Arnhem Hwy, 3.4 km W of Shady Camp turn-off, I.D. Cowie 1367 & R. Booth (DNA); Tabletop Range, C. Dunlop 6795 (DNA); Nitmiluk Amphitheatre, M. Evans 3395 (DNA); 65 km from Pine Creek on UDP Falls road, C.H. Gittins (BRI).

Distribution. From Litchfield to Katherine in the Northern Territory.

Habitat. Known from tropical woodland.

Flowering and fruiting period. January to December.

Etymology. The subspecific epithet is in reference to the very narrow and linear leaves.

Notes. This subspecies is easily recognizable by its very narrow branchlet leaves and crustaceous appearance on drying.

9. *Sauropus torridus* J.T. Hunter & J.J. Bruhl, *sp. nov.*

S. ochrophylo similis sed stipulus triangularibus, sepalis masculinis brevioribus, pedicello femineo longiore, antheris longioribus, et seminibus longioribus differt.

Typus: Mitchell Plateau, N of Mining Camp top of plateau, Western Australia, 18 June 1976, K.F. Kenneally 5092 (*holo:* PERTH: PERTH01640771).

[*Sauropus ochrophyllus* *auct. non* (Benth.) Airy Shaw: J.W. Green, Census of the Vascular Plants of Western Australia: 108 (1985).]

Phyllanthus sp. B, Wheeler *et al.*, Flora of the Kimberley Region 624 (1992).

Dioecious *perennial plants*. *Branchlets* persistent, ellipsoid, 5.5-17 cm long, 0.6-1.5 mm wide, glabrous to sparsely papillose or scabrous. *Stipules* persistent, free, 0.5-1.6 mm long, yellow-brown to red-brown, triangular, glabrous or papillose to scabrous; base truncate to rounded; apex acuminate to acute; margins entire. *Branch leaves* reduced leaf-like or scale-like, pallid-brown to red-brown, glabrous or papillose to scabrous. *Branchlet leaves* alternate, distichous, jointed, brown when dry. *Petiole* 0.5-1.6 mm long, 0.5-1.1 mm wide, glabrous or with persistent indumentum. *Lamina* symmetrical although some slightly falcate, plane, 11.5-35 mm long, 4-19.6 mm wide, elliptic to obovate, obscurely pinnately veined, glabrous or sparsely papillose to scabrous; base oblique, attenuate; apex erect, acute, mucronate to apiculate, occasionally with a small callous; margins plane, not thickened. *Bracts and bracteoles* persistent, glabrous or with indumentum. *Inflorescence* indeterminate, axillary, sessile. *Male flowers* 1-2 per cluster; pedicels 0.6-1.3 mm long, glabrous; sepals 6, variously connate, erect, lobes 17-24 mm long or to 44 mm including tube, sepals 0.7-1.2 mm wide, elliptic to ovate, fleshy, glabrous; apex rounded to obtuse; margins lacerate to erose; stamens 3, symmetrical, erect; filaments completely connate, erect, terete, 0.6-0.8 mm long; anthers extrorse, erect, linear to elliptic, 3-3.4 mm long; apiculum 0.8-0.9 mm long, red-brown; locules parallel. *Female flowers* solitary; pedicels at anthesis 0.8-1.5 mm long, 0.5-0.7 mm wide, in fruit 6.2-9.5 mm long in fruit, 0.5-0.7 mm wide; sepals persistent, 6, free, at anthesis erect, in fruit divergent to reflexed, white to yellow, fleshy, glabrous; apex rounded, obtuse to acute; 1.8-4.5 mm long, 0.4-1.3 mm wide, linear, elliptic, obovate, to oblanceolate; styles well developed, 3, free, variously divided, erect to ascending, red, 1-1.7 mm long, 0.2-0.5 mm wide, narrow-terete, glabrous to papillose; style branches linear; stigmatic surface papillate; ovary 0.8-1.4 mm long, 0.2-0.5 mm wide, ovoid to globose, smooth, glabrous, sometimes appearing glaucous. *Fruit* a septicidal capsule, ovoid to ellipsoid, *c.* 8.5 mm long, *c.* 10 mm wide, red-brown, smooth, glabrous, grooved septicidally; apex rounded to obtuse; column persistent, narrow oblong to 'lanceolate', 5.1-6.5 mm long. *Seeds* red-brown, prismatic, laterally compressed, 6.9-7.6 mm long, 3.3-3.8 mm wide, smooth, sometimes with a minor wing; hilum slightly depressed, not bordered although the region around the hilum is distinctly paler in colour, ovate, cavity more or less basal. (Figure 1D-E)

Selected specimens examined. WESTERN AUSTRALIA: Surveyors vine thicket, Mitchell Plateau, NW Kimberley, *K.F. Kenneally* 8561 (PERTH); Airstrip, 5 km NW of mining campsite Mitchell Plateau, N Kimberley, *K.F. Kenneally* 7720 (PERTH); 43.8 km N of campsite of Port Warrender track, Mitchell Plateau, N. Kimberley, *K.F. Kenneally* 8561 (PERTH).
NORTHERN TERRITORY: Mt Wells, 15 July 1886, *J.E. Tennison Woods s.n.* (MEL).

Distribution. Known only from the Mitchell Plateau in Western Australia and Mt Wells in the Northern Territory.

Flowering and fruiting period. August to October.

Conservation status. CALM Conservation Codes for Western Australian Flora: Priority Two. A ROTAP code (Briggs & Leigh 1988) of 2xE-Wy is suggested. Only one collection has been seen from the Northern Territory, and that specimen was collected in 1886. No subsequent collections have been made in the Northern Territory, where this species may now be extinct.

Etymology. The specific epithet means hot place and refers to the locality of the collections which are from the tropical north.

Notes. Very few specimens of this species have been seen. Only one male specimen is known, and the fruit measurements are based on only one mature fruit. Therefore, caution must be applied in regard to

the measurements given here. Morphologically, *Sauropus torridus* is similar to *S. ochrophyllus*, but differs in having shorter sepals, and longer pedicels, anthers and seeds (Table 3).

Table 3. Comparison of selected characters for *Sauropus ochrophyllus* and *S. torridus* (measurements in mm)

	<i>S. ochrophyllus</i>	<i>S. torridus</i>
Stipules	Linear, lanceolate, or narrow triangular	Triangular
Lamina base	Truncate, rounded or obtuse	Attenuate
Male sepals	Free	Connate
Male sepal length	2.8-5.4	1.7-2.4
Male sepal apex	Rounded to obtuse	Acute to acuminate
Anther length	1.3-2.6	3-3.4
Female pedicel in fruit	3.5-5	6.2-9.5
Female sepal length	1.6-1.8	0.7-1.2
Seed length	5.8-6.2	6.9-7.6

10. *Sauropus trachyspermus* (F. Muell.) Airy Shaw, Kew Bull. 35: 685 (1980) - *Phyllanthus trachyspermus* F. Muell., Trans. Phil. Soc. Vict. 1: 14 (1855) - *Glochidion trachyspermum* (F. Muell.) H. Eichler, Flora of South Australia Supplement 2nd edn 210 (1965). *Type*: junction of the Darling and Murray Rivers, [New South Wales or Victoria], *F. Mueller* (MEL).

Phyllanthus rhytidosperrmus F. Muell. ex Muell. Arg., Linnaea 34: 70 (1855) - *Glochidion rhytidosperrmum* (Muell. Arg.) H. Eichler, Flora of South Australia Supplement 2nd edn 210 (1965). *Type*: Depot Creek, Upper Victoria River [Northern Territory], *F. Mueller* (*holo*: MEL).

Sauropus hubbardii Airy Shaw, Kew Bull. 35: 677 (1980). *Type*: Nonda, between Hughenden and Cloncurry in mixed grassland in heavy dark brown soil, 160 m [Queensland], 6 Feb [ruary] 1931, *Hubbard & Winders* 7295 (*holo*: K).

Sauropus sp. A, Wheeler *et al.*, Flora of the Kimberley Region 628 (1992).

Distribution. *Sauropus trachyspermus* is the most widespread and common *Sauropus* species within Australia, with a far greater range than the other species from Northern Territory and Western Australia (Table 4). It grows from the Kimberley region of Western Australia across northern and central Australia, down to western Victoria.

Notes. It is likely that this species forms a complex of at least two if not more species. Airy Shaw (1980) separated *Sauropus hubbardii* on the basis of larger habit and leaves, obtuse to rounded sepals, and completely divided styles. We, however, found that these characters were not constant and that these

features varied widely within *Sauropus trachyspermus* s. str. and *S. hubbardii*. Certainly there are very low-growing variants and variants that have been found over 2 m tall. This variation in habit does not seem to co-vary with any other feature that we recorded for the species. While features of seed sculpturing showed some promise in separating these variants, no clear co-varying discontinuities were found.

Table 4. Distribution of Northern Territory and Western Australian species of *Sauropus* within Australia based on the regions adopted by Hnatiuk (1990)

Taxon	Distribution
<i>S. arenosus</i> J.T. Hunter & J.J. Bruhl	6, 12
<i>S. brunonis</i> (S. Moore) Airy Shaw	25
<i>S. crassifolius</i> (Muell. Arg.) Airy Shaw	7, 13, 14, 15, 16
<i>S. ditassoides</i> (Muell. Arg.) Airy Shaw	25
<i>S. dunlopii</i> J.T. Hunter & J.J. Bruhl	25
<i>S. filicinus</i> J.T. Hunter & J.J. Bruhl	25
<i>S. glaucus</i> (F. Muell.) Airy Shaw	25
<i>S. gracilis</i> J.T. Hunter & J.J. Bruhl	25
<i>S. huntii</i> (Ewart & O. Davies) Airy Shaw	26, 27, 28
<i>S. ochrophyllus</i> (Benth.) Airy Shaw	25
<i>S. paucifolius</i> J.T. Hunter & J.J. Bruhl	25
<i>S. ramosissimus</i> (F. Muell.) Airy Shaw	29, 31, 35, 43, 56, 65, 68, 70
<i>S. rigens</i> (F. Muell.) Airy Shaw	29, 34, 47, 54, 55, 48, 56, 70
<i>S. rigidulus</i> (F. Muell. ex Muell. Arg.) Airy Shaw	25
<i>S. rimophilus</i> J.T. Hunter & J.J. Bruhl	25
<i>S. salignus</i> J.T. Hunter & J.J. Bruhl	1
<i>S. stenocladus</i> (Muell. Arg.) J.T. Hunter & J.J. Bruhl	25
<i>S. torridus</i> J.T. Hunter & J.J. Bruhl	1, 25
<i>S. trachyspermus</i> (F. Muell.) Airy Shaw	1, 2, 3, 4, 12, 14, 25, 26, 27, 28, 29, 30, 31, 34, 35, 43, 45, 47, 48, 50, 51, 53, 54, 55, 56, 68, 70, 71, 73, 74

Key to the *Sauropus* species and subspecies of the Northern Territory and Western Australia

- 1 Branch leaves only ever scale-like (Phyllanthoid branching) 2
- 1: Branch leaves normal, reduced in size or if scale-like then with a mixture of normal and/or leaves reduced in size over the plant 11
- 2 Stipules white, cream, yellow-brown or green 3
- 2: Stipules red, red-brown or black 5
- 3 Plants monoecious; branchlets ribbed and glabrous; lamina 0.2-4.5 mm wide; fruit 3.56 mm long; seed 2.5-5 mm long **S. trachyspermus**
- 3: Plants dioecious; branchlets not ribbed, with indumentum; lamina 4.7-15.4 mm wide; fruit 6.8-10.6 mm long; seed 5.9-8.2 mm long 4
- 4 Lamina apex acute to acuminate, margins thickened; male sepals free; anthers 0.4-0.9 mm long; female pedicel length at anthesis 0.8-2.5 mm long, in fruit 1.5-4.5 mm long; styles connate **S. arenosus**
- 4: Lamina apex obtuse, rounded to obcordate, margins not thickened; male sepals connate; anthers 1-2.6 mm long; female pedicel length at anthesis 2-6.5 mm long, in fruit 2.8-8 mm long; styles free **S. huntii**
- 5 Branchlets ribbed 6
- 5: Branchlets not ribbed, although some may be finely striate 7
- 6 Stems angular; leaves green, 4.9-8 mm wide, elliptic to obovate, margins not thickened, paler below; sepals elliptic, ovate or obovate; male sepals free; filaments 0.6-1 mm long; anthers 0.2-0.4 mm long; styles divided less than half way, 0.3-0.5 mm long **S. salignus**
- 6: Stems rounded to ellipsoid; leaves grey, 0.3-1.6 mm wide, linear, margins thickened, concolourous; sepals linear to oblanceolate; male sepals connate; filaments 0.1-0.5 mm long; anthers 0.8-1 mm long; styles divided more than half way, 0.7-1.4 mm long **S. stenocladus** subsp. **pinifolius**
- 7 Stipules ovate, glabrous; scales often purple in colour; male sepals free; female flowers 1-2 per cluster; seeds undulate **S. crassifolius**
- 7: Stipules triangular to narrow-triangular, with indumentum; scales brown to red-brown; male sepals fused if only basally; female flowers solitary; seeds smooth 8
- 8 Lamina base cordate; female pedicel at anthesis 1-3.5 mm long **S. ditassoides**
- 8: Lamina base various but never cordate; female pedicels at anthesis to 1.2 mm long 9
- 9 Stipules 0.8-1.6 mm long; lamina concave, concolourous; erect and not growing out of sandstone cliffs **S. rigidulus**
- 9: Stipules 0.4-1.2 mm long; lamina plane to convex, paler below; growing pendulously, or horizontally from sandstone cliffs 10
- 10 Male sepals obovate, 1.3-3.3 mm long; female pedicel length in fruit 1-1.6 mm; anther length 1.2-1.7 mm; styles connate; ovary length 1.2-1.6 mm; seed length 6.8-9 mm long **S. rimophilus**
- 10: Male sepals elliptic, 0.4-0.9 mm long; female pedicel length in fruit 0.5-0.7 mm; anther length 0.5-0.6; styles free; ovary length 0.7-0.8 mm; seed length 5.2-6 mm long **S. filicinus**
- 11 Plants viscid **S. ramosissimus**
- 11: Plants not viscid 12

- 12 Branchlets spinose, leaves pseudo-verticellate **S. rigens**
- 12: Branchlets not spinose, leaves never pseudo-verticellate 13
- 13 Plants pilose to hirsute, rarely glabrous; filaments 0.05-0.3 mm long; anthers 0.2-0.4 mm long; not apiculate **S. brunonis**
- 13: Plants glabrous or scabrous, if hirsute then lamina only to 3.2 mm wide; filaments 0.3-1.6 mm long; anthers 0.3-3.4 mm long; usually apiculate 14
- 14 Lamina 0.6-3.8 mm wide 15
- 14: Lamina 4-35 mm wide 18
- 15 Plants monoecious; leaves green when dry, paler below; flowers green; male pedicels 1.8-3.2 mm long; female sepals 1.3-1.8 mm long; filaments 0.3-0.4 mm long; anthers 1-1.1 mm long; growing from sandstone cliffs **S. gracilis**
- 15: Plants dioecious; leaves greyish when dry, concolourous; flowers yellow when fresh; male pedicels 0.5-1.5 mm long; female sepals 0.4-1 mm long; filaments 0.4-1 mm long; anthers 0.3-0.5 mm long or 1.1-2.7 mm long; growing in tropical woodland 16
- 16 Plants hirsute; lamina margins plane; male flowers solitary; sepals obovate; male sepals shortly connate, 0.8-1.6 mm long; female pedicels 0.2-0.8 mm long at anthesis; female sepals 1-1.4 mm long at anthesis; anthers 0.3-0.5 mm long; apiculum c. 0.1 mm long; style 0.4-0.7 mm long **S. dunlopia**
- 16: Plants glabrous or rarely scabrous; lamina margins plane to revolute; male flowers 1-6 per cluster; sepals linear to oblanceolate; male sepals variously connate, 2-4.5 mm long; female pedicels 1-8 mm long at anthesis; female sepals 2-4.9 mm long at anthesis; anthers 1.1-2.7 mm long; apiculum 0.1-0.6 mm long; style 0.1-0.6 mm long 17
- 17 Branchlets not ribbed; lamina 8-43 mm long, 1.5-8 mm wide, commonly elliptic to oblanceolate and more or less straight; male sepals 3.6-4.5 mm long; anthers 2.4-2.7 mm long; fruit 7-9.5 mm long; column 7-8.5 mm long; seeds 8-9.2 mm long **S. glaucus** (Figure 1H,I)
- 17: Branchlets ribbed; lamina 5.5-18.5 mm long, 0.6-2.4 mm wide, commonly narrow and bent to one side; male sepals 2-2.6 mm long; anthers 1.1-1.5 mm long; fruit 4.8-5.6 mm long; column 3.7-4.5 mm long; seeds 4.8-5.2 mm long **S. stenocladus** subsp. **stenocladus**
- 18 Branchlets angular and ribbed; lamina paler below, usually only 1-3 leaves per plant **S. paucifolius**
- 18: Branchlets ellipsoid to flattened; lamina concolourous, leaves many per plant 19
- 19 Male sepals free; anthers 1.3-2.6 mm long; apiculum 0.1-0.4 mm long, cream; seeds 5.8-6.2 mm long **S. ochrophyllus**
- 19: Male sepals fused; anthers 2.4-3.4 mm long; apiculum 0.4-0.9 mm long, red-brown; seeds 6.9-9.2 mm long 20
- 20 Male sepals 1.7-2.4 mm long, 0.7-1.2 mm wide, elliptic to ovate; female pedicels at anthesis 0.8-1.5 mm long; anthers 3-3.4 mm long; apiculum 0.8-0.9 mm long; column 5.1-6.5 mm long; seeds 6.9-7.6 mm long **S. torridus**
- 20: Male sepals 3.6-4.5 mm long, 0.3-0.6 mm wide, oblanceolate; female pedicels at anthesis 2-8 mm long; anthers 2.4-2.7 mm long; apiculum 0.4-0.6 mm long; column 7-8.5 mm long; seeds 8-9.2 mm long **S. glaucus** (Figure 1H,I)

Acknowledgements

We wish to thank the heads of the following herbaria for the loan of specimens: A, AD, BM, BRI, CANB, CBG, DAV, DNA, GH, HO, K, MEL, NSW, PERTH, QRS. Thanks also to the heads of A, BM, BRI, CANB, CBG, DNA, G, GH, K, LINN, MAREEBA, MEL, NSW, QRS for access to facilities and specimens; Clyde Dunlop and Judy Egan (DNA) for assistance with field work; Grady Webster (DAV) for helpful comments; David Mackay (NE) for the illustrations; Laurie Adams (CANB), Paul Wilson (PERTH), Anne Harrison and Frances Quinn (NE) for the Latin descriptions; Frances Quinn and Bruce Thomson (Dept. of Environment, Qld) for comments on the manuscript; the director of the Australian National Parks Service and the state equivalents in New South Wales, Northern Territory, Queensland, and South Australia for permission to collect in service areas; and Research School of Biological Sciences (ANU) for financial support to J.J. Bruhl for visits to G, K and LINN. This project was supported by funding from Australian Biological Resources Study.

References

- Airy Shaw, H.K. (1980). A partial synopsis of the Euphorbiaceae-Platylobeae of Australia (excluding *Phyllanthus*, *Euphorbia* and *Calycepeplus*). Kew Bulletin 35: 577-700.
- Briggs, J.D. & Leigh, J.H. (1988). "Rare or Threatened Australian Plants." Special Publication No. 14. (Australian National Parks and Wildlife Service: Canberra.)
- Dallwitz, M.J. (1980). A general system for coding taxonomic descriptions. Taxon 29: 41-46.
- Dallwitz, M.J., Paine, T.A. & Zurcher, E.J. (1993). "User's Guide to the DELTA System." (Division of Entomology, CSIRO: Canberra.)
- Hnatiuk, R.J. (1990). "Census of Australian Vascular Plants." Australian Flora and Fauna Series 11. (Bureau of Flora and Fauna, AGPS Press: Canberra.)
- Hunter, J.T. & Bruhl, J.J. (1997). Four new rare species of *Sauropus* Blume (Euphorbiaceae: Phyllanthaceae) from north Queensland. *Austrobaileya* (in press).
- Stearn, W.T. (1992). "Botanical Latin." 4th edn (David & Charles: Melksham.)
- Webster, G.L. (1970). A revision of *Phyllanthus* (Euphorbiaceae) in the continental United States. *Brittonia* 22: 44-76.