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TWO NEW SPECIES OF *DICRASTYLIS* J.DRUMM. EX HARVEY (CHLOANTHACEAE) FROM WESTERN AUSTRALIA

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Abstract

Two new *Dicrastylis* species, *D. archeri* and *D. capitellata* are described from Western Australia. A detailed description of each species is supplemented by a habit sketch of a flower branch and analytical drawings of the flowers. The affinities and distribution are considered.

Introduction

The first comprehensive treatment of the genus was published by Bentham (1870) with only five species. Later, F. Mueller (1889) recorded ten species in the genus and Diels & Pritzel (1904) reported eleven from Western Australia. The most recent taxonomic revision of the genus, however, was published by Munir (1978) with 26 species, of which more than half were new.

Two new species of the genus have been recently collected from near Mt Heywood, north-east of Esperance. They are here described and fitted into part of the original key (Munir, 1978) to show similarities and differences with closely related species. A full discussion of their affinities is provided under each species.

Key to the species

1a. Cymes of subglobose clusters, mostly sessile, arranged spicately along terminal axis; leaves linear, with recurved margins 6

b. Cymes lax or of subglobose clusters, pedunculate, arranged in corymbose thyrse; leaves as above or variously shaped and flat 2

2a. Cymes congested, forming somewhat woolly clusters ..... 12. *D.morrisonii* & allied species

b. Cymes in lax thyrse, not forming woolly clusters 3

3a. Leaves typically obovate ..... 6. *D. obovata*

b. Leaves variously shaped, not obovate 4

4a. Stems and leaves conspicuously tomentose ..... 8. *D. parvifolia, D. fulva* & allied species

b. Stems and adaxial leaf surface becoming glabrous or apparently so to the naked eye 5

5a. Stems golden-orange or ferruginous; leaves flat, apiculate; flowers 5 - 6 mm long; corolla-tube almost glabrous inside, lobes ± spathulate, 2 - 2.5 mm long ..... 7. *D. linearifolia*

b. Stems cineraceous; leaves with recurved margins, obtuse; flowers 2.5 - 3 mm long; corolla-tube villous inside, lobes elliptic, 1.5 - 2 mm long ..... 7A. *D. archeri*

6a. Leaves mostly in whorls of 3, 2 - 6 mm broad, tomentose all over; cymes mostly opposite, 7 - 15 mm diam.; flowers 8 - 9 mm long; calyx-lobes tomentose on the upper half inside, 3 - 3.5 mm long ..... 18. *D. lewellinii*

b. Leaves opposite, 1 - 1.5 mm broad, puberulous-scabridous adaxially; cymes always alternate, 5 - 7 (-8) mm diam.; flowers 4 - 4.5 mm long; calyx-lobes glabrous inside, 1.5 - 2 mm long ..... 18A. *D. capitellata*

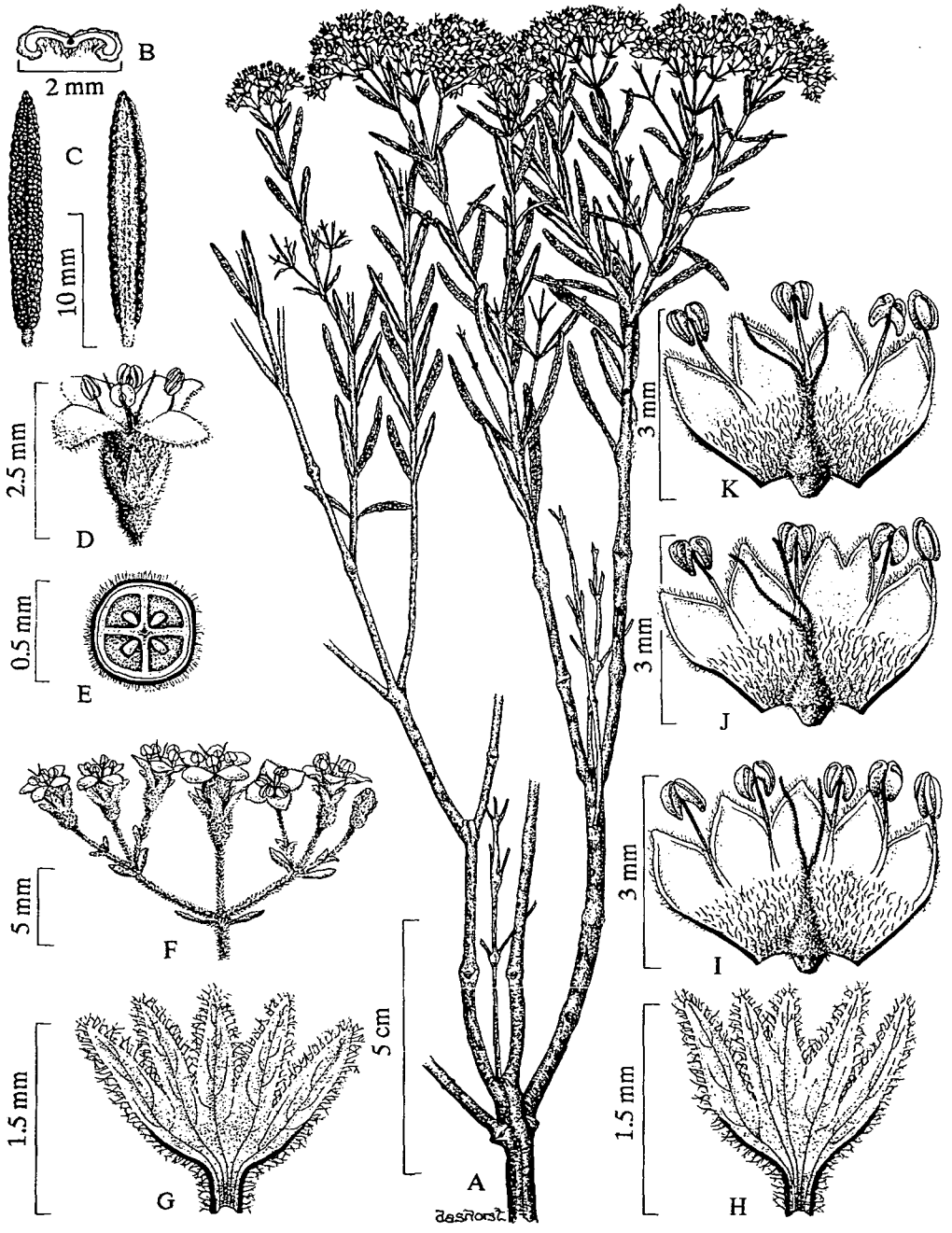


Fig. 1. *Dicrastylis archeri* Munir (A-K, *W.R. Archer 112907*: AD, holotype). A, habit drawing of a flowering branch; B, transverse section of leaf; C, leaf showing rugose and glabrous adaxial surface and greyish-pubescent abaxial surface; D, flower; E, transverse section of ovary; F, cyme; G, calyx vertically cut open showing glabrous inside; H, calyx cut open showing tendency towards reduction in lobes; I, corolla cut open showing androecium and gynoecium; J, corolla cut open showing 4 stamens and tendency towards reduction in corolla-lobes; K, corolla cut open showing 4 corolla-lobes and 4 stamens.

Dicrastylis archeri Munir, sp. nov.

Frutex erectus, usque 1 m altus. *Caules* erecti, ramosi, cylindrici, cinerascenti-pubescentes, lignosis. *Folia* simplicia decussata, sessilia, linearia vel peranguste lanceolato-linearia, glabra rugosaque superne (adaxialiter), infra (abaxialiter) cinerascenti-pubescentia, ad apicem obtusa, marginibus recurvatis, (5-) 10 - 20 (-25) mm longa, 1 - 2 mm lata. *Inflorescentia* cymosa; cymae in thyrso corymboso dispositae, semi-laxae; pedunculi primarii tenues, cinerascenti-pubescentes vel pallide brunneo-cinerascenti-pubescentes, 10 - 25 mm longi. *Flores* 4 vel 5-meri, terminales pro parte maxima 4-meri, pedicellati, bracteati, cremeo-albi, 2.5 - 3 mm longi; pedicelli 1 - 2.5 mm longi, dense albido- vel cinerascenti-pubescentes. *Calyx* 4 vel 5-lobatus, basaliter tubo vadoso (± 0.5 mm longo). *Corolla* cremeo-alba, superne 4 vel 5-lobata, infra tubularis, 2.5 - 3 mm longa, extra cinerascenti-pubescens, in tubo villosa; lobi elliptici vel ovato-elliptici, versus apicem gradatim angustati, 1.5 - 2 mm longi, 1 - 1.5 mm lati; tubus vadosus, 0.5 - 1 mm longus. *Stamina* 4 vel 5, exserta, in fauce corollae inserta; filamenta filiformia, glabra, ± 1.5 mm longa; antherae 2-lobatae, dorsifixae, ambito ± rotundatae, 0.5 mm diametro, lobi liberi et in parte inferiori divergentes, longitudinaliter dehiscentes. *Ovarium* globosum, dense tomentosum, ± 0.5 mm diametro, 4-loculatum in quoque loculo ovulo uno; stylus exsertus, profunde 2-ramosus, 2.5 - 3 mm longus, in dimidio inferiore dense tomentosus, lobi (rami) filiformes, in dimidio superiore glaberi, apicaliter stigmati. *Fructus* non visus.

Type: *W.R. Archer 112907*, 23.5 km NNE of Mt Heywood, 33°09'S, 122°37'E, 1.xii.1990 (AD, holotype; PERTH, isotype).

Description (Fig. 1)

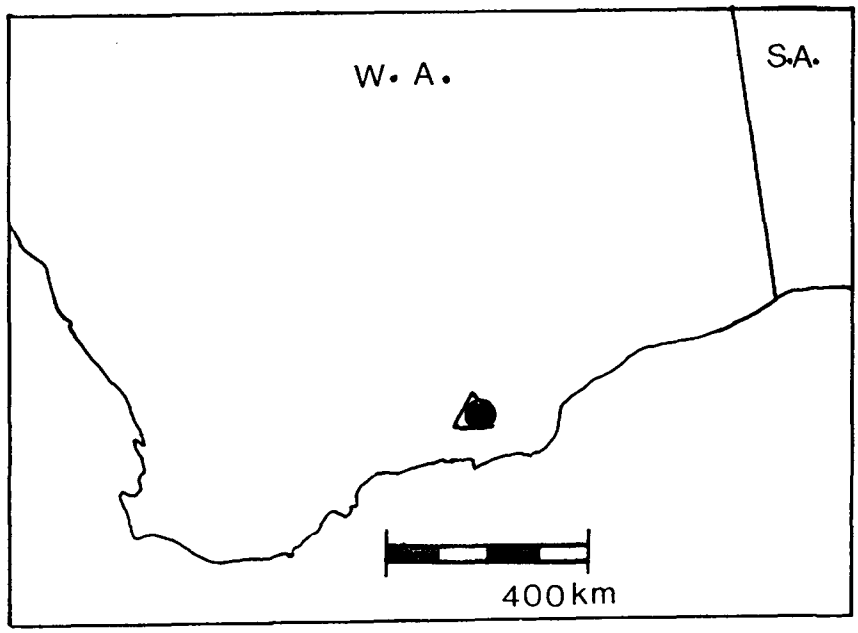
Upright shrub to 1 m high. *Stems* erect, branched, cylindrical, greyish-pubescent, woody. *Leaves* simple, decussate, sessile, linear, oblong or sometimes narrowly linear-lanceolate, glabrous and rugose above (adaxially), greyish-pubescent below (abaxially), obtuse at the tip, with recurved margins, (5-) 10 - 20 (-25) mm long, 1 - 2 mm wide. *Inflorescence* cymose; cymes arranged in a corymbose thyrse, semi-lax; primary peduncles slender, greyish pubescent to light brownish-grey pubescent, 10 - 25 mm long. *Flowers* 4 or 5-merous, the terminal ones mostly 4-merous, pedicellate, bracteate, creamy-white, 2.5 - 3 mm long; pedicels 1 - 2.5 mm long, densely whitish- or greyish-pubescent. *Calyx* 4 or 5-lobed with a shallow tube at the base, 1.5 - 2 mm long, whitish- or greyish-pubescent outside, glabrous inside; lobes linear-lanceolate, 1 - 1.5 mm long; tube shallow ± 0.5 mm long. *Corolla* creamy-white, 4 or 5-lobed above, tubular below, 2.5 - 3 mm long, greyish-pubescent outside, villous inside the tube; lobes elliptic or ovate-elliptic, gradually narrowing towards the apex, 1.5 - 2 mm long, 1 - 1.5 mm wide; tube shallow, 0.5 - 1 mm long. *Stamens* usually 4, sometimes 5, exserted, inserted in the corolla-throat; filaments filiform, glabrous, ± 1.5 mm long; anthers 2-lobed, dorsifixed, ± rounded in outline, 0.5 mm diam., lobes free and divergent in the lower half, longitudinally dehiscent. *Ovary* globose, densely tomentose, ± 0.5 mm diam., 4-locular with one ovule in each cell; style exserted, deeply 2-branched, 2.5 - 3 mm long, densely tomentose in the lower half, lobes (branches) filiform, glabrous in the distal half, stigmatic at the end. *Fruit* not seen.

Specimens examined

AUSTRALIA: WESTERN AUSTRALIA: *W.R. Archer 112907*, 23.5 km NNE of Mt. Heywood, 33°09'S, 122°37'E, 1.xii.1990 (AD, holotype; PERTH, isotype); *W.R. Archer 2411904*, loc. cit., 33°09'S, 122°39'E, 24.xi.1990 (AD, CANB, MEL — paratypes); *W.R. Archer 112908*, 23.5 km NNE of Mt Heywood, 33°09'S, 122°39'E, 1.xi.1990 (AD, BM, HO - paratypes).

Distribution (Map 1)

Endemic to southern part of Western Australia where it has been recorded from between 33° and 34°S and between 122° and 123°E, being north-north-east of Mt Heywood which is about 100 km NE of Esperance.



Map 1. Distribution of *D. archeri* ●, *D. curva* △.

Comments

This species is named after Mr William R. Archer of WA Nurseries at Merivale who collected the type material of this species.

Generally, the flowers in this species are 5-merous but in the terminal flower of most cymes the number of calyx- and corolla-lobes and stamens are usually 4 each.

Affinities

D. archeri is nearest to *D. linearifolia* Munir in its leaves being linear, linear-oblong or sometimes linear-lanceolate, sessile, greyish-pubescent abaxially; cymes arranged in a corymbose thyrse; flowers shortly pedicellate; calyx and corolla greyish-pubescent outside; petals yellowish-white; stamens and style exserted. Nevertheless, *D. archeri* can easily be distinguished by its stem and branches being greyish-pubescent; leaves with recurved margins, glabrous adaxially, obtuse at the tip, somewhat smaller, 5 - 20 x 1 - 2 mm; flowers smaller, 2.5 - 3 mm long only; calyx and corolla more densely pubescent outside; corolla-lobes elliptic, 1.5 - 2 mm long, gradually narrowing towards the apex, not spathulate or rounded at the tip and corolla-tube densely villous inside. In *D. linearifolia*, the stem is

golden orange or somewhat rusty coloured; leaves flat with apiculate tip, greyish-puberulous adaxially, 12 - 40 x 2 - 4 mm; inflorescence somewhat lax; flowers larger, 5 - 6 mm long; corolla-lobes 2 - 2.5 mm long, more or less spathulate or with a broad rounded tip, spreading to about 8 mm diam.; corolla-tube almost glabrous or with very sparse short hairs inside.

There are several characters common between *D. archeri* and *D. parvifolia* F. Muell. In both species, the stem and branches are greyish-pubescent; leaves sessile, usually linear or linear-oblong, obtuse, with recurved margins and cymes arranged in a corymbose thyrse. However, *D. parvifolia* can easily be identified by its leaves and inflorescence being much more congested; leaves greyish-pubescent all over, sometimes ± verticillate on the main stem; primary peduncles deeply brownish-pubescent or greyish-rusty pubescent; flowers smaller than *D. archeri*, 2 - 2.5 mm long; calyx and corolla sparsely glandular but densely tomentose outside; corolla-tube shallow, hardly 0.5 mm long and ovary glandular and tomentose.

Dicrastylis capitellata Munir, sp.nov.

Frutex humilis, 20 - 25 cm altus, usque c. 100 cm diametro extendens. *Caulis* erect, prope basem ramosus; rami cylindrici, lignosi, dense cinerascenti-pubescentes vel cinerascenti-tomentosi. *Folia* sessilia, decussata, anguste linearia, obtusa, marginibus recurvato-revolutis, (4-) 6 - 15 (-20) mm longa, 1 - 1.5 mm lata, superne (adaxialiter) puberulo-scabra subrugulosaque, infra (abaxialiter) dense cinerascenti-tomentosa. *Inflorescentia* ex fasciculis florum (cymis) subglobosis constans in spicis irregulariter interruptis et parum circinatis (scorpiodeis) disposita. *Fasciculi florum* (cymae) saepe sessiles, interdum breviter pedunculati, plerumque alternati, plerumque floribus 7, sub anthesi 5 - 7 (-8) mm diametro, quisque flos bracto uno subtento; pedunculi usque 3 mm longi, cinerascenti-tomentosi; bracti sessiles, elliptico-ovati, quam calyce longiores, abaxialiter glandulosi et dense tomentosi, adaxialiter glabri, 2 - 3 mm longi, 1 - 1.5 mm lati. *Flores* sessiles, bracteati, 4 - 4.5 mm longi. *Calyx* 5-lobatus, raro 4-lobatus, ± 3 mm longus, extra glandulosus tomentosusque, intra glaber; lobi lanceolati vel anguste elliptico-lanceolati, 1.5 - 2 mm longi, 0.5 - 1 mm lati; tubus vadosus, ± 1 mm longus. *Corolla* diluto-caerulea vel pallido-malvina, infra tubularis, plerumque superne 4-lobata, rare 5-lobata, ± 4 mm longa, extra lobos glandulosa tomentosaque in tubo villosa et in superficie interiore loborum sparsim villosa; lobi oblongi vel elliptico-oblongi, lobus anticus quam alii aliquantum major, ± 2 mm longus, 1.5 mm latus, lobi alii aequales, 1 - 1.5 mm longi, 0.5 - 1 mm lati; tubus ± cylindricus, basi angustus, ± 1.5 mm longus. *Stamina* plerumque 4, raro 5, exserta, in fauce corollae inserta; filamenta filiformia, glabra, 1.5 - 2 mm longa; antherae 2-lobatae, dorsifixae, aliquantum oblongae, 0.5 - 1 mm longae, ± 0.5 mm latae, lobi liberi in dimidio inferiore divergentesque, longitudinaliter dehiscentes. *Ovarium* subglobosum usque obovoideum, dense tomentosum, 0.5 - 1 mm diametro, 4-loculare, ovulo uno in quoque cellula; stylus breviter exsertus, profundissime 2-ramosus, 2 - 2.5 mm longus (lobi inclusi), in dimidio inferiore dense tomentosus, superne glaber, lobi filiformes, 1 - 1.5 mm longi. *Fructus* non visus.

Type: *W.R. Archer 112904*, 23 km NNE Mt Heywood, 33°09'S, 122°37'E, 1.xii.1990 (AD, holotype; AD, BRI, CANB, DNA, K, MEL, NSW, PERTH —isotypes).

Description (Fig. 2)

Low shrub 20 - 25 cm high, spreading to about 100 cm diam. *Stem* erect, branched near the base; branches cylindrical, woody, densely greyish-pubescent or greyish-tomentose. *Leaves* sessile, decussate, linear to narrow linear, obtuse, with recurved-revolute margins, (4-) 6 - 15 (-20) mm long, 1 - 1.5 mm broad, puberulous-scabrous and somewhat rugulose above (adaxially), densely greyish-tomentose below (abaxially). *Inflorescence* of subglobose flower clusters (cymes) arranged into irregularly interrupted and somewhat coiled (scorpioidal) spikes. *Flower-clusters* (cymes) often sessile, sometimes shortly pedunculate, usually alternate, usually 7-flowers, 5 - 7 (-8) mm diam. at anthesis, each flower subtended by a bract; peduncles up to 3 mm long, greyish-tomentose; bracts sessile, elliptic-ovate, shorter than calyx, glandular and densely tomentose abaxially, glabrous adaxially, 2 - 3 mm long, 1 - 1.5 mm wide. *Flowers* sessile, bracteate, 4 - 4.5 mm long. *Calyx* 5-lobed, rarely 4-lobed, ± 3 mm long, glandular and tomentose outside, glabrous

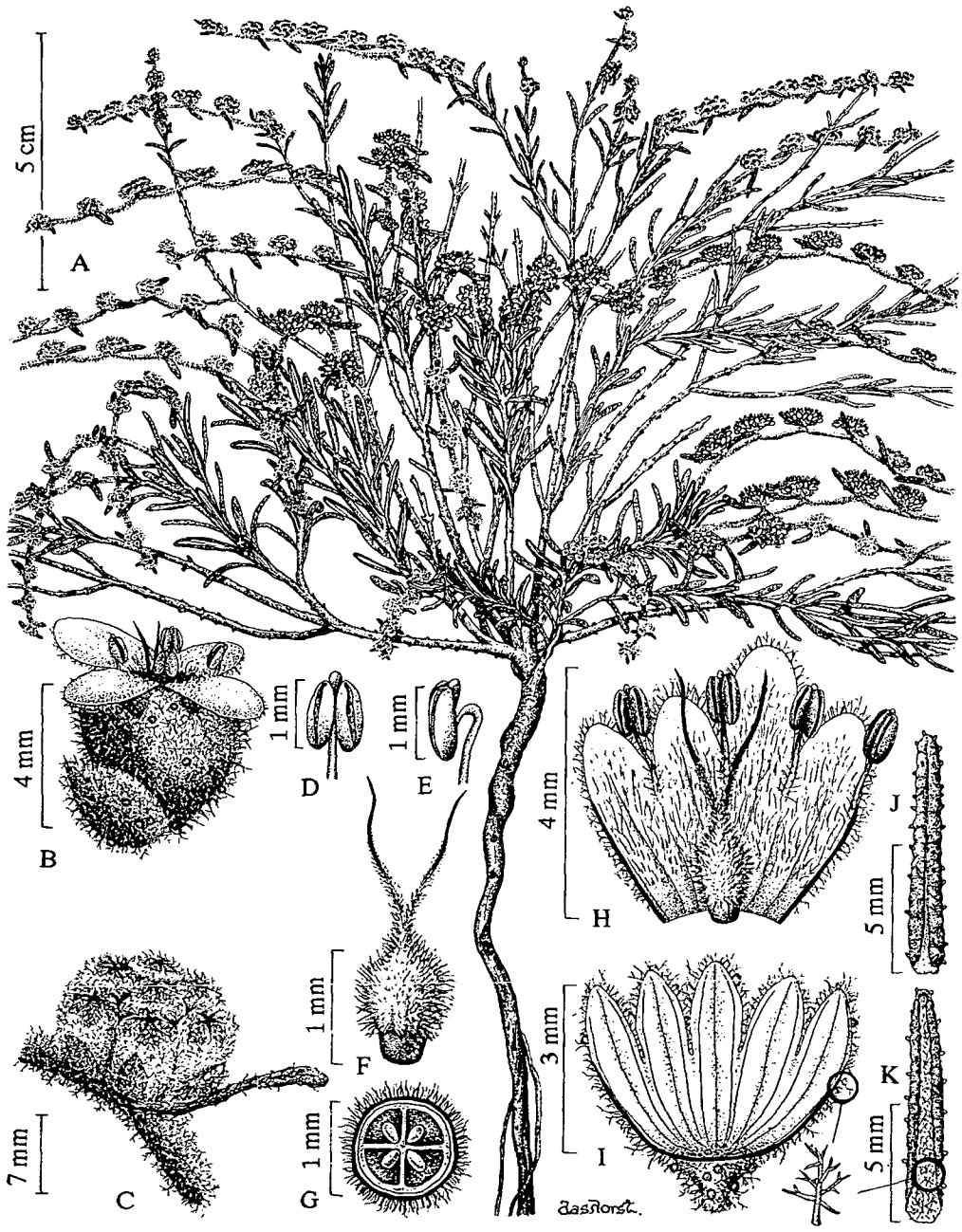


Fig. 2. *Dicrastylis capitellata* Munir (A-K, *W.R. Archer 112904*: AD, holotype). A, habit sketch; B, flowers with bract; C, cyme; D, front view of anther showing longitudinal dehiscing pore; E, side view of anther; F, gynoecium; G, transverse section of ovary; H, corolla cut open showing androecium and gynoecium; I, calyx cut open showing glabrous interior; J, leaf showing adaxial scabrous surface; K, leaf showing abaxial tomentose surface.

inside; lobes lanceolate or narrow elliptic-lanceolate, 1.5 - 2 mm long, 0.5 - 1 mm wide; tube shallow, ± 1 mm long. *Corolla* light purplish-blue or pale mauve, tubular below, usually 4-lobed, rarely 5-lobed, ± 4 mm long, glandular and tomentose outside the lobes, villous inside the tube and sparsely so on the inner face of the lobes; lobes oblong or elliptic-oblong, the anterior lobe somewhat larger than the others, ± 2 mm long, 1.5 mm wide, the other lobes equal, 1 - 1.5 mm long, 0.5 - 1 mm wide; tube ± cylindrical, narrow at the base, ± 1.5 mm long. *Stamens* usually 4, rarely 5, exserted, inserted in the corolla-throat; filaments filiform, glabrous, 1.5 - 2 mm long; anthers 2-lobed, dorsifixed, somewhat oblong, 0.5 - 1 mm long, ± 0.5 mm broad, lobes free and divergent in the lower half, longitudinally dehiscent. *Ovary* subglobose to obovoid, densely tomentose, 0.5 - 1 mm diam., 4-locular, with one ovule in each cell; style shortly exserted, very deeply 2-branched, 2 - 2.5 mm long (including lobes), densely tomentose in the lower half, glabrous above, lobes filiform, 1 - 1.5 mm long. *Fruit* not seen.

Specimens examined

AUSTRALIA: WESTERN AUSTRALIA: *W.R. Archer 112902*, 18 km N Mt Heywood, 33°11'S, 122°32'E, 11.xii.1990 (AD, paratype; L, NY —isoparatype); *W.R. Archer 112904*, 23 km NNE Mt Heywood, 33° 09'S, 122° 37'E, 1.xii.1990 (AD, holotype; AD, BRI, CANB, DNA, K, MEL, NSW, PERTH —isotypes).

Distribution (Map 1)

Endemic to southern part of Western Australia where it has been recorded from between 33° and 34°S and between 122° and 123°E, being north and north-east of Mt Heywood which is about 100 km NE of Esperance.

Comments

The specific epithet of this species is proposed after its small flower-heads along the terminal axis. In each flower-head, the peripheral flowers are found to open ("mature") before the central (terminal) flower. The known distribution range of *D. capitellata* seems to be similar to that of *D. archeri*.

Affinities

D. capitellata seems to be nearest to *D. lewellinii* (F. Muell.)F. Muell. in its flowers being arranged into subglobose clusters (cymes) along terminal axis; leaves sessile, linear, with recurved margins; flower-clusters (cymes) 7-flowered each; calyx and corolla tomentose outside; corolla purplish-blue, lobes entire, the anterior lobe larger than the others; stamens and style exserted; stamens usually 4 in each flower. Nevertheless, *D. capitellata* may easily be distinguished by its leaves being mostly opposite, puberulous-scabrous above (adaxially), 1 - 1.5 mm broad; flower-clusters (cymes) smaller, 5 - 7 (-8) mm diam. at anthesis, alternate, usually sessile; bracts smaller, 2 - 3 mm long; flowers 4 - 4.5 mm long; calyx and corolla respectively ± 3 mm and 4 mm long; corolla usually 4-lobed; calyx-lobes not tomentose inside; filaments and anthers respectively 1.5 - 2 mm and ± 0.5 mm long and style 2 - 2.5 mm long. In *D. lewellinii*, the leaves are mostly in whorls of 3, greyish-tomentose all over, 2 - 6 mm broad; flower-clusters (cymes) 7 - 15 mm diam. at anthesis, the lower clusters sometimes with a peduncle of up to 5 mm long; bracts larger, 3 - 3.5 mm long; flowers 8 - 9 mm long; calyx and corolla respectively 5 - 6 mm and 7 - 8.5 mm long; calyx-lobes tomentose on the upper half inside; filaments and style respectively 3.5 - 4 mm and 6 - 7 mm long. Moreover, *D. lewellinii* occurs in all mainland states except Western Australia, while *D. capitellata* is endemic to southern part of Western Australia.

There are several characters common between *D. capitellata* and *D. microphylla* Munir. Both have subglobose sessile flower-clusters (cymes) each comprising 7-flowers, calyx and corolla tomentose outside, corolla mauve and villous inside the tube and stamens and style exserted. However, *D. microphylla* can readily be identified by its densely tomentose stem and leaves, very woolly flower-clusters (cymes) which are always opposite along the slender purple peduncle, larger flowers and flower-bracts. Moreover, the number of calyx- and corolla-lobes and stamens are 5 each in a flower.

There are some characters common between *D. capitellata* and *D. nicholasii* F. Muell. The shape and average leaf-size and subglobose flower-clusters (cymes) are similar in both species. Nevertheless, the flower-clusters (cymes) in *D. nicholasii* are always on a distinct peduncle of 15 - 25 mm long, flowers 5-merous and longer than *D. capitellata*.

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