

THE GENUS DUCROSIA AND ITS ALLIES

REINO ALAVA*

ABSTRACT. The generic limits of *Ducrosia* Boiss. (Umbelliferae-Tordyliinae) are considered and re-established. The conspecificity of *Ducrosia ovatiloba* Dunn & Williams with *Tricholaser afghanicum* Gilli is established and a new combination is made: *Tricholaser ovatilobum* (Dunn & Williams) Alava. *Ducrosia stenocarpa* Bornm. & Gauba is transferred into the new genus *Kalakia* Alava which is formally described, and the new combination *Kalakia stenocarpa* (Bornm. & Gauba) Alava is made.

The following paper results from studies in the genus *Ducrosia* prior to my preparing the account of it and its allies for Reehinger's *Flora Iranica*.

HISTORY OF THE GENUS

De Candolle in his *Prodromus* (1830, 4:196), described a new species of Umbelliferae based on Olivier & Bruguère's collection made "in Persia inter Teheran et Ispahan". He considered it to be a member of the genus *Zozimia*, and named it *Z. anethifolia* referring to its distinctive leaf characters which separated it from the other species of the genus, *Z. absinthifolia* (Vent.) Link.

Boissier (1844), while working on the rich collections of Aucher-Eloy, realised that two of Aucher's collections, numbers 3596 and 4577, "ad Ispahan", were conspecific with Olivier & Bruguère's specimen. He did not, however, agree with De Candolle's concept that they were members of *Zozimia* but considered that they represented a genus of their own. This he described, and named *Ducrosia*, after the Swiss botanist the Rev. Ducros, transferring De Candolle's species to it: *D. anethifolia* (DC.) Boiss. At the same time Boissier described another species of *Ducrosia* based on Olivier & Bruguère's specimen collected "inter Bagdad et Alep" and on Aucher 3729 "in desertis Assyriae". Since the most striking differences between *D. anethifolia* and this new species were in the leaf characters, Boissier, named it *D. flabellifolia*.

Jaubert & Spach (1848), however, did not recognise Boissier's new genus; neither did they consider the two taxa—*D. anethifolia* and *D. flabellifolia*—as being different, but treated them both under De Candolle's name, *Zozimia anethifolia*. Nevertheless, the figures on their plate 238 depict *Ducrosia anethifolia*, none of them *D. flabellifolia*.

Until this time, the only area in which the members of the genus *Ducrosia* were known to occur was the Iraqi-Iranian desert region.

In 1921 Dunn & Williams described a new species of *Ducrosia* from "India, Chitral, Ziarat, 2000 m" collected in July 1908 by Toppin (no. 452). They named it *D. ovatiloba*—again on the basis of the differences in the leaf characters. In this connection they also briefly discussed the other species attributed to *Ducrosia* and stated that this new species "amplifies the limits of *Ducrosia* as previously defined both morphologically and geographically".

* Department of Botany, University of Turku, SF-20500 Turku 50, Finland.

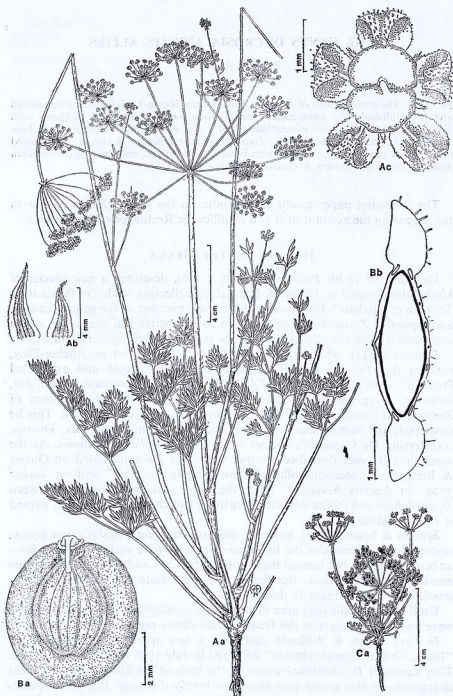


FIG. 1. *Ducrosia anethifolia* (DC.) Boiss. Aa, habit; Ab, involucre bracts; Ac, flower, stamens removed; Ba, mature mericarp; Bb, cross section of mericarp; Ca, habit of a depauperate plant. (Drawn from: A, *Alava* 10680; B, *Alava* 10726; C, *Rehinger* 34762).

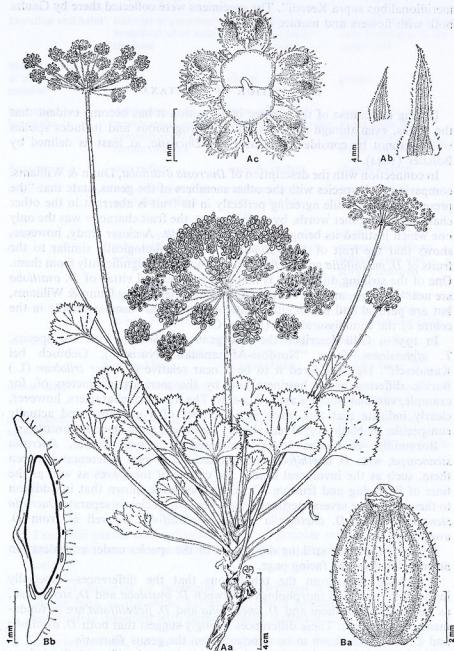


FIG. 2. *Ducrosia flabellifolia* Boiss. Aa, habit; Ab, involucral bracts; Ac, flower, stamens removed; Ba, mature mericarp; Bb, cross section of mericarp. (Drawn from: A, Sharif 2 iv 1951; B, *Iranshahr & Moussavi* 30 v 1973).

Bornmüller & Gauba (1934) added one more species to the genus, *D. stenocarpa*, from "Persia borealis: montium Elburs in declivitatibus meridionalibus supra Keredj". The specimens were collected there by Gauba both with flowers and mature fruits.

EVALUATION OF THE TAXA

During the course of the present investigation it has become evident that the genus, even though small, is quite heterogeneous and includes species which cannot be considered members of *Ducrosia*, at least as defined by Boissier (1844).

In connection with the description of *Ducrosia ovatiloba*, Dunn & Williams, comparing their species with the other members of the genus, state that "the present example while agreeing perfectly in its fruit is aberrant in the other characters". In other words, by their concept, the fruit character was the only one which justified its being included in *Ducrosia*. A closer study, however, shows that the fruit of *D. ovatiloba* is not morphologically similar to the fruits of *D. anethifolia* and *D. flabellifolia*, but differs significantly from them. One of the striking differences is that the commissural vittae of *D. ovatiloba* are not "arcuatae, margini contiguae", as characterized by Dunn & Williams, but are parallel and lie on either side of the central vascular bundle in the centre of the commissural face (Fig. 4, Cd).

In 1958-9 Gilli described the new genus *Tricholaser* with one species, *T. afghanicum*, from "Nordost-Afghanistan (Nuristan), Gebüsch bei Kamdesch". He considered it to be a near relative of *Laser trilobum* (L.) Borkh. differing in its hairiness and by the mericarp characters of, for example, vascular bundles and oil canals. The mericarp characters, however, clearly indicate that this taxon is a member of Tordyliinae and actually conspecific, as Nasir (1972) has already indicated, with *Ducrosia ovatiloba*.

Bornmüller & Gauba (1934) compared their new species, *Ducrosia stenocarpa*, with *D. anethifolia* and pointed out several differences between them, such as the involucre bracts, the colour of the leaves as well as the time of flowering and fruiting. Closer studies have shown that in addition to these, there are several pertinent characters which clearly separate *Ducrosia stenocarpa* from *D. anethifolia* and *D. flabellifolia*, as well as from *D. ovatiloba*.

Some of the most striking differences of the species under consideration are tabulated on the facing page.

It can be seen from the tabulations that the differences—especially in the floral and fruit morphology—between *D. ovatiloba* and *D. stenocarpa*, as well as between them and *D. anethifolia* and *D. flabellifolia* are of fundamental significance. These differences strongly suggest that both *D. ovatiloba* and *D. stenocarpa* have to be removed from the genus *Ducrosia*.

Since *Ducrosia ovatiloba* Dunn & Williams is conspecific with *Tricholaser afghanicum* Gilli, it has to be transferred to that genus, and a new combination made. *Ducrosia stenocarpa* Bornm. & Gauba, on the other hand, represents an undescribed genus and the name *Kalakia* is chosen for it after the N Iranian village Kalak near Keredj, where the species grows abundantly.

	<i>D. anethifolia</i> <i>D. flabellifolia</i>	<i>D. stenocarpa</i>	<i>D. ovatiloba</i>
Duration and habit	biennial or perennial branching at or near the base	annual, flexuose, branching pseudo-dichotomously	perennial with solitary stem branching in the upper part
fibrous collar of petiolar remains	absent	absent	present
bracts and bracteoles	dorsiventral with membranous and unevenly erose or serrate margins	terete without membranous margins	dorsiventral, united at the base, with membranous, softly ciliate margins
flowers	non radiant	strongly radiant	slightly radiant
calyx teeth	well-developed and persistent in fruit	rudimentary in ovary, obsolete in fruit	small and inconspicuous
petals	greenish-yellow ovate with an inflexed apex abaxial face covered with tubular to pointed hairs	white strongly emarginate with an inflexed apex abaxial face glabrous	white emarginate with an inflexed apex and strong, coloured mid-vein abaxial face with sparse covering of long tubular hairs
mericarps	round ovate to orbicular with stiff pointed hairs	narrowly oblong with tubular to vesicular hairs	broadly elliptic with long, pointed hairs
dorsal vittae	thin, inconspicuous	obsolete	conspicuous and well-developed
commissural vittae	arcuate, along the inner edge of the tumid margins	obsolete	parallel, one on each side of the central vascular bundle

KEY TO THE GENERA

- 1 Perennial plants with a fibrous collar of petiolar remains at the base of the stem; leaves ternately compound, segments suborbicular 3. *Tricholaser*
- + Annual, biennial or perennial plants without a fibrous collar at the base of the stem; leaves entire and palmately lobed or triterately dissected with narrow linear segments 2
- 2 Flowers radiant, petals white and glabrous on the abaxial face; fruit oblong 2. *Kalakia*
- + Flowers actinomorphic (non radiant), petals greenish-yellow and densely hairy on the abaxial face; fruit round-ovate to elliptic 1. *Ducrosia*

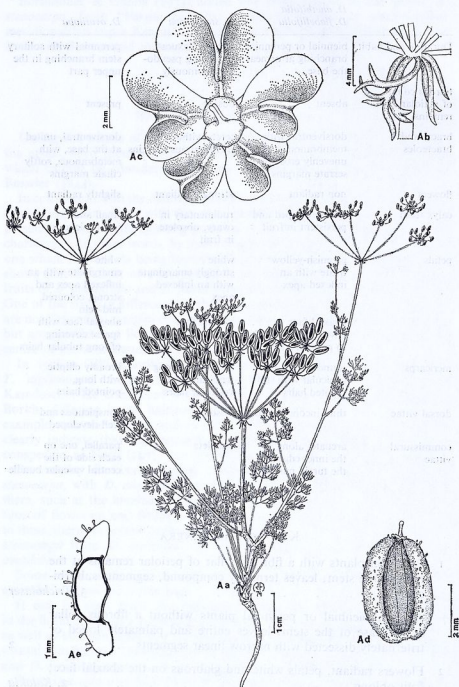


FIG. 3. *Kalakia stenocarpa* (Bornm. & Gauba) Alava. Aa, habit; Ab, involucre bracts; Ac, flower, stamens removed; Ad, mature mericarp; Ae, cross section of mericarp. (Drawn from: *Iranshahr*, IRAN 13980-E).

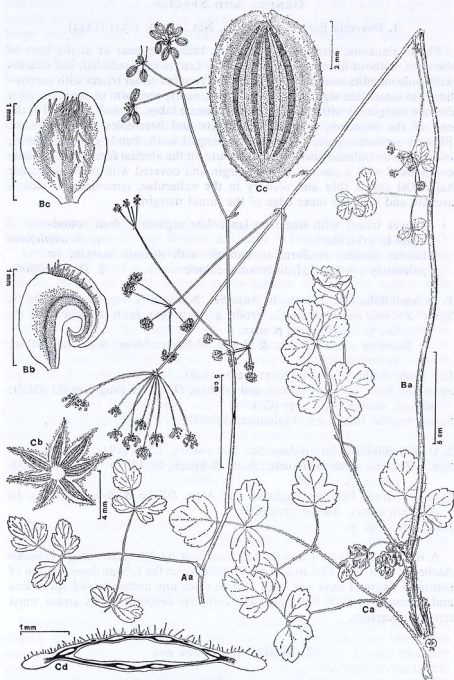


FIG. 4. *Tricholaser ovatilobum* (Dunn & Williams) Alava. Aa, habit; Ba, habit; Bb, adaxial side of petal; Bc, abaxial side of petal; Ca, basal leaf; Cb, involucrel bracts; Cc, mature mericarp; Cd, cross section of mericarp. (Drawn from: A, Toppin 452; B, Gilli 2013; C, Kerstan 812).

GENERA AND SPECIES

1. *Ducrosia* Boiss. in Ann. Sci. Nat., ser. 3, 1:341 (1844).

Plants glaucous, biennial or perennial, branching near or at the base of the stem, without fibrous petiolar remains. Leaves long-petioled, leaf sheaths with wide membranous and ciliate margins; lamina either trisect with narrow-linear to lanceolate segments, or undivided, nearly reniform to cuneate with a dentate margin, or with palmately trifid cuneate lobes. Umbels terminal at the end of the branches, many-rayed. Bracts and bracteoles small, reflexed. Flowers actinomorphic. Calyx with 5 unequal teeth. Petals greenish-yellow, ovate with an inflexed apex, densely hirsute on the abaxial face. Fruit dorsally compressed with a smooth tumid margin and covered with pointed tubular hairs. Oil canals thin and solitary in the valliculae, commissural ones 2, arcuate and near the inner edge of the tumid margin.

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|---|--|----------------------------|
| 1 | Leaves trisect with linear to lanceolate segments; fruit round-ovate to orbicular | 1. <i>D. anethifolia</i> |
| + | Leaves simple, reniform to cuneate with dentate margin, or palmately 3-5-lobed; fruit broadly elliptic | 2. <i>D. flabellifolia</i> |

1. *D. anethifolia* (DC.) Boiss. in Ann. Sci. Nat. ser. 3, 1:342 (1844). Fig. 1. Syn.: *Zozimia anethifolia* DC., Prodr. 4:196 (1830). Jaub. & Spach, Ill. Pl. Or. 3: t. 238 (1848) p. max. p.

Ducrosia olivieri Boiss. & Buhse in Nouv. Mém. Soc. Nat. Mosc. 12:101 (1860).

lc.: Jaub. & Spach, Ill. Pl. Or. 3: t. 238 (1848).

Syntypes. Iran: between Tehran and Isfahan, *Olivier & Bruguère* (G-DC!); Isfahan, *Aucher* 3596, 4577 (G!).

Syria, Arabia, Iraq, Iran, Afghanistan, Pakistan. Fig. 5.

2. *D. flabellifolia* Boiss. in Ann. Sci. Nat., ser. 3, 1:342 (1844). Fig. 2.

Syn.: *Zozimia anethifolia* auctt.; Jaub. & Spach, Ill. Pl. Or. 3: t. 238 (1848). p. min. p. non DC.

Syntypes. Iraq: between Baghdad and Alep, *Olivier & Bruguère* (P!). In Assyrian desert, *Aucher* 3729 (G!).

Iraq, Iran. Fig. 5.

A further species of *Ducrosia* was described by Ascherson as *D. ismaëlis* Aschers. (Verh. Bot. Ver. Brand. 21:67, 1880) from the Libyan desert region of southern Egypt. I have not been able to trace any authenticated specimens and, because also of the inadequate original description, its status must remain uncertain.

2. *Kalakia* Alava, gen. nov.

Planta annua, semipedalis vel raro pedalis, foetida. *Radix* tenuis verticalis. *Caulis* exilis, suberectus, plerumque ab ima basi parce subdichotome ramosus, subflexuosus. *Folia* viridia; basalia et caulina inferiora petiolata, petiolo laminae subaequilongo vel brevior; petiolus ad basin in vaginam late hyalino-marginatam dilatatus; lamina in lacinias parvas angustissime lineares

triternatim dissecta, in ambitu ovata vel subovata. *Folia caulina* superiora basalia similia, sed minora, sine petiolo, cum vagina bene evoluta. *Umbellae* longe pedunculatae, 6-8(-10)-radiatae, radiis divergentibus, glaberrimis, subaequilongis, in statu fructifero 1-2 cm longis. *Involucra et involucella* polyphyllia, reflexa, viridia (non albo-marginata), saepe in lacinulas lineares fissa vel partita. *Flores* hermaphroditi vel unisexuales. *Calyx* dentes rudimentales, in fructu evanescentes. *Petala* alba, obcordato-marginata, apice hamato-incurva, glabra valde radiantia. *Stylopodium* depressum, leviter crenatum, stylis brevibus erectis, demum arcuato-reflexis. *Fructus* oblongus, a dorso compressus, pilis tubuloso-vesiculosus obsitus, margine valde tumido laevissime cinctus. *Vittae* valleculares commissuralesque obsoletae.

Species unica.

K. stenocarpa (Bornm. & Gauba) Alava, **comb. nov.** Fig. 3.

Syn.: *Ducrosia stenocarpa* Bornm. & Gauba in Feddes Rep. 36:344 (1934).

Annual plant with a foetid smell, stems sparsely branched and flaccid, 10-20(-30) cm. Root a slender taproot. Leaves bright green (not glaucous); petioles shorter or rarely as long as the lamina; leaf sheaths with a wide membranous margin, lamina tri-ternately dissected into narrow-linear segments. Umbels terminal with 6-8(-10) rays; rays spreading and varying in length, smooth, at the fruiting stage 1 to 2 cm long. Bracts and bracteoles reflexed and narrow-linear without a membranous margin, entire or often the longer ones bifurcate to bipinnate. Hermaphrodite and unisexual flowers present in the same umbellules. Calyx teeth rudimentary, disappearing in the fruiting stage. Petals white, obcordate-emarginate with an inflexed apex, glabrous on the abaxial face, outer ones radiant. Stylopodium depressed with a crenate margin; styles short, first erect, later arcuate. Fruit oblong, dorsally compressed with strongly tumid smooth margins, and all covered with tubular-vesicular hairs. Dorsal and commissural vittae obsolete.

Syntypes. Iran: south-facing slopes of Elburs mountains above Keredj, 3 vi 1933 and 11/19 vi 1934, Gauba (TEH).

Iran. Fig. 5.

The species occurs in two forms: f. *hebecarpa* Bornm. & Gauba, with a caescent ovary; f. *leiocarpa* Bornm. & Gauba in which both the ovary and mature fruits are glabrous.

3. *Tricholaser* Gilli in Feddes Rep. 61:205 (1958-59).

Perennial with a solitary stem, sparingly branching in the upper part, stem slightly striate and retrorse-puberulent, softly villose in the lower internodes and petioles. Fibrous collar of petiolar remains present. Leaves ternately compound, petiole shorter than the lamina, segments suborbicular, the lateral ones sessile, nearly entire or coarsely crenate or shallowly trisect and with narrow cartilaginous margins. Uppermost cauline leaves reduced to sheaths. Umbels terminal with long peduncles, 5-10-radiate, rays unequal in length. Bracts and bracteoles lanceolate, united at the base and with membranous-ciliate margins. Flowers slightly radiant, unisexual and hermaphrodite

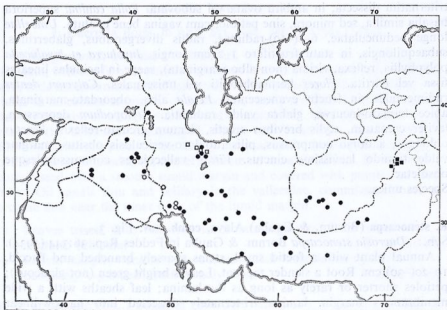


FIG. 5. General distribution of the different species in the Flora Iranica area: ● *Ducrosia anethifolia* (DC.) Boiss.; ○ *D. flabellifolia* Boiss.; □ *Kalakia stenocarpa* (Bornm. & Gauba) Alava; ■ *Tricholaser ovatilobum* (Dunn & Williams) Alava. Not all the known localities are indicated on the map.

present in the same umbellule. Calyx teeth small and inconspicuous, triangular. Petals white, slightly obcordate-emarginate and with an inflexed apex and a strong, dark mid-vein, sparsely covered with tubular hairs on the abaxial face. Stylopodium depressed with a crenate margin; styles reflexed. Fruit dorsally compressed with a smooth tumid margin, all covered with stiff hairs. Dorsal vittae strong and conspicuous, one in each vallecule, commissural ones two, parallel to each other at the centre of the commissural face.

Monotypic.

T. ovatilobum (Dunn & Williams) Alava, *comb. nov.* Fig. 4.

Syn.: *Ducrosia ovatiloba* Dunn & Williams in Kew Bull. 1921:120 (1921); Rechinger & Riedl in Biol. Skr. (Symb. Afghan. 5) 13, 4:50 (1963); Nasir in Fl. West Pakistan, ed. Nasir, E. & Ali, S.I., 20:166 (1972).

Tricholaser afghanicum Gilli in Feddes Rep. 61:206 (1958-9).

lc.: Rechinger & Riedl in Biol. Skr. 13, 4:51, fig. 19 (1963); Gilli in Feddes Rep. 61:206, t.9 (1958-9).

Type. Chitral: Ziarat, 2000 m, Toppin 452 (K!).

Afghanistan, West Pakistan. Fig. 5.

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