

DISTRIBUTION OF PLUMBAGIN IN THE PLUMBAGINACEAE

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Key Word Index—*Plumbago*; *Dyerophytum*; Plumbaginaceae; plumbagin; naphthoquinone; chemotaxonomy.

Abstract—Plumbagin (2-methyl-5-hydroxy-1,4-naphthoquinone) was found in roots and aerial parts of *Dyerophytum africanum*, *Plumbago pearsonii* and in roots of *P. auriculata*.

THE RELATIONSHIP between phenolic chemistry and plant systematics of the Plumbaginaceae was studied by Harborne.¹ In the available material, plumbagin (2-methyl-5-hydroxy-1,4-naphthoquinone) was found in members of three (*Plumbago*, *Plumbagella*, *Ceratostigma*) of the four genera of the tribe Plumbagineae.

The present results (Table 1) on fresh plant material are an extension of the earlier survey. Plumbagin was also found to be characteristic of *Dyerophytum* (fourth genus of the tribe Plumbagineae). Plumbagin was isolated from roots and aerial parts of another member of the genus *Plumbago*, *P. pearsonii*. The species *P. auriculata* (syn. *P. capensis*) has been subject to previous investigation.¹ It was, however, included in this work to verify the results with a geographically remote population; the absence of plumbagin from the aerial parts was confirmed.

TABLE 1. DISTRIBUTION OF PLUMBAGIN IN THE PLUMBAGINACEAE

Plant ^{2,3}	<i>Plumbago auriculata</i> Lam. (syn. <i>P. capensis</i>)	<i>Plumbago pearsonii</i> L.Bol.	<i>Dyerophytum africanum</i> (Lam.) Kuntze
Occurrence ²	Temperate areas Southern Africa	Arid areas South Western Africa	Arid areas South Western Africa
Aerial parts	No plumbagin	Plumbagin	Plumbagin
Roots	Plumbagin	Plumbagin	Plumbagin
%CHCl ₃ extractives	0.9	1.0	0.9
%CHCl ₃ extractives insoluble in MeOH	14	50	93

The chloroform extractives from the roots of both the plants from the arid areas were lipoidal with a low concentration of plumbagin in contrast to the plumbagin-rich amorphous extractives from the roots of *P. auriculata*. The plumbagin concentration in the chloroform

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¹ J. B. HARBORNE, *Phytochem.* **6**, 1415 (1967).

² R. A. DYER, in *Flora of Southern Africa* (edited by R. A. DYER, L. E. CODD and H. B. RYCROFT), Vol. 26, pp. 15–31, The Government Printer, Pretoria, Republic of South Africa (1963).

³ Voucher specimens are deposited in the herbarium of this department. Voucher numbers are: *Plumbago pearsonii*, 6343/3; *Plumbago auriculata*, 6343/5; *Dyerophytum africanum*, 6345.

extracts from the aerial parts of both plants from the arid areas were small but could be detected through sublimation and TLC.

EXPERIMENTAL

Roots. Dried CHCl_3 extracts were mixed with $5\times$ their amount of MeOH and the mixtures cooled at 4° for 1 hr and filtered. The methanolic filtrates were concentrated and mixed with $10\times$ their amount of boiling H_2O . On cooling, crystals of plumbagin were formed.⁴

Aerial parts. Dried CHCl_3 extracts were gently heated and the evolved vapour condensed on a cold surface. The condensate was subjected to TLC and plumbagin was identified by co-chromatography with an authentic sample on silicagel plates.

⁴ L. M. VAN DER VIJVER and A. P. LÖTTER, *Planta Med.* **20**, 8 (1971).