

standard methods.³ Spectrophotometry of the purified pigment showed that it was probably a cyanidin-3-glycoside,⁵ and on hydrolysis it gave glucose and cyanidin only.

Description of Plant Lines

'Eclipse': R.H.S. Colour Chart No. 60B. The plants are relatively normal in appearance apart from the heavily pigmented flowers, and there is little pigment in other parts of the plant. 'Black Prince', R.H.S. Colour Chart No. 59A, is similar to 'Eclipse', but the leaves and stem are very deeply pigmented with antirrhinin. There is no cyanidin glucoside in these parts.

Anthocyanin is absent from all parts of 'Pan Crimson' except the corolla and calyx. The flowers are large and show the mutation *sulfurea*, which extends aurones throughout the adaxial epidermis, whereas normally they are confined to a small spot on the palette. Anthocyanin is present in all cells of the palette, but shows a speckled appearance on the lobes, which varies with temperature and light, similar to a highly back-mutating line of *pallida-recurrens*.⁴ Intensity is superficially 46B, owing to background aurones, but the abaxial epidermis and corolla tube are 74C.

EXPERIMENTAL

Extraction of pigments and paper chromatography were carried out using standard methods.³ Sugars were separated in ethyl acetate-pyridine-water (12:5:4). TLC was on MN300 cellulose. Spectrophotometry was carried out using a Pye Unicam SP8000 spectrophotometer by the standard methods.⁵

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³ J. B. HARBORNE, *J. Chromatog.* **1**, 473 (1958).

⁴ B. J. HARRISON and J. S. FINCHAM, *Heredity* **19**, 237 (1966).

⁵ J. B. HARBORNE, *Biochem. J.* **70**, 22 (1958).

ALKALOIDS OF *ANTIRRHINUM ORONTIUM*

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Plant. *Antirrhinum orontium* L. (*Misopates orontium* Raf.)

Uses. Medicinal.¹

¹ M. GRIEVE, *A Modern Herbal* (edited by C. F. LEVEL), p. 815, Cape, London (1931).

Previous work. Alkaloids of *Antirrhinum majus* L.^{2,3}

Present work. Dried, aerial parts extracted with 95% ethanol. Ethanol free extract fractionated by the standard procedure for alkaloidal bases.

Tertiary fraction. Chromatography on alumina columns (CHCl₃-EtOH mixtures) followed by preparative TLC purification (alumina 1 mm-CHCl₃ and CHCl₃-EtOH, 3:1) yielded seven alkaloids. Four were obtained in insufficient quantity for further investigation at this stage.

Base A. White needles, m.p. 78°. Shown by UV, IR and MS to be identical with 4-methyl-2,6-naphthyridine previously isolated from *A. majus*.^{2,3}

Base B. Yellow solid, m.p. above 250° (decomp). C₁₅H₉N₃O (by mass spectrometry). UV λ_{\max} 207(s), 224, 228, 254(s), 280(s), 352 nm; IR 800, 850, 1040, 1140, 1180, 1230, 1320, 1430, 1460, 1600, 1630, 1690 cm⁻¹; MS *m/e* (rel. intensity) M⁺247 (100), 220(6), 192(8), 164(11), 135(9), 122(8), 164(11), 135(9), 122(8), 110(8), 94(14).

Base C. White solid. MW 208 (mass spectrometry). UV λ_{\max} 212, 245, 282(s) nm; MS *m/e* (rel. intensity) M⁺208(10), 193(11), 176(43), 162(11), 149(10), 121(100), 107(33), 87(32), 69(41), 47(68).

Water-soluble fraction. Single component isolated by reineckate precipitation.⁴ By paper chromatography (Whatman No. 1, *n*-butanol saturated dilute HCl, *R_f* 22) and comparison of IR spectra shown to be identical with choline chloride.

² K. J. HARKISS and D. SWIFT, *Tetrahedron Letters* 4773 (1970).

³ K. J. HARKISS, *Planta medica*, in press (1971).

⁴ K-T, LEE, *Nature, Lond.* **188**, 65 (1960).

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IDENTIFICATION OF SCUTELLAREIN 4'-METHYL ETHER IN *LINARIA AERUGINEA*

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Abstract—Scutellarein 4'-methyl ether has been isolated for the first time from plants, from leaves of *L. aeruginea*. It is accompanied by acacetin and occurs in association with glucose and rhamnose.

DURING an earlier chemotaxonomic survey of flavonoids in the genus *Linaria*, a partly characterized methyl ether of scutellarein was found in two of the 12 species studies, in