Compound isolated. Ecdysterone was isolated from the whole plant by methods described previously[3] and was identified by direct comparison with authentic material by mixed m.p., co-chromatography (TLC, 2 solvent systems), co-chromatography of acetates (TLC, 1 solvent system), m.s., u.v. and i.r. analysis.

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BIGNONIACEAE

ANTHOCYANINS FROM ARGENTINE *TABEBUIA* SPECIES

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FLOWERS of *Tabebuia ipe* and *Tabebuia avellanedae* have been found to contain cyanidin 3-rutinoside, cyanidin 3-glucoside and peonidin 3-rutinoside; the latter in small amounts.

A chemotaxonomic survey of flavonoids in leaves and flowers of Bignoniaceae has already been carried out,[1] but the anthocyanins present in *Tabebuia* species were not identified.

Most of the species of *Tabebuia* are native to tropical and subtropical America and there is a wide range in their flower colours, from yellow to red and purple. *Tabebuia avellanedae* (Lorentz) Griseb. and *Tabebuia ipe* (Mart.) Standley are indigenous to the north-west and north-east of Argentina and are the only Argentine *Tabebuia* plants with red flowers. These species are of interest because they contain the same anthocyanins and their glycosidic pattern, -3-rutinoside-, has already been found in the family Bignoniaceae.

RESULTS AND DISCUSSION

Preliminary separation of the concentrated flower extract gave two bands: I and II (the former in trace amounts). In all the other solvents used, band II split into two bands: II_a and II_b (both dull magenta in u.v. light). The relative amounts increased in the order: $II_a > II_b > I$.

R_f values and spectral data[2] are given in Table 1. Total acid hydrolysis[3] of I and II_a provided glucose and rhamnose, while II_b gave glucose. The R_f and spectral data for

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TABLE 1. IDENTIFICATION OF ANTHOCYANINS OF THE GENUS *Tabebuia*

Bands	Absorption spectra*		After total hydrolysis		R_f values (×100) in†			
	λ max (nm)	$AlCl_3$	Aglycone	Sugar	BAW	Bu–HCl	1% HCl	HOAc–HCl
I	273;522	–	Pn	glu rham	42	23	17	46
II_a	277,526	+	Cy	glu rham	36	31	18	43
II_b	273,525	+	Cy	glu	31	28	06	26

* In methanol containing 0 01% conc. HCl.

† On Whatman No. 1 paper. Abbreviations: BAW (*n*-BuOH, HOAc, H_2O; 4:1·5, v/v); (Bu–HCl) (*n*-BuOH, 2N HCl; 1:1 v/v); 1% HCl (conc. HCl, H_2O; 3:97 v/v); HOAc–HCl (HOAc, conc. HCl, H_2O; 15:3:82, v/v). Pn = Peonidin; Cy = Cyanidin; glu = glucose; rham = rhamnose.

aglycones indicated that pigments II_a and II_b contained cyanidin whereas I had peonidin. A positive $AlCl_3$ shift for II_a and II_b, and a negative one for I confirmed this identification. The E_{440}/E_{max} absorption ratios indicated that all three pigments had the 5-position free.

Controlled hydrolysis[4] of I gave an intermediate identified as peonidin 3-glucoside by co-chromatography with an authentic sample. Pigment II_a gave cyanidin 3-glucoside as intermediate and no intermediates were obtained from II_b.

Oxidation of pigments I and II_a with hydrogen peroxide[5] released the same disaccharide: rutinose, which must therefore be located at the 3-position. On the other hand the oxidation of II_b gave glucose. The identity of the three pigments was confirmed by co-chromatography with standards.

EXPERIMENTAL

Authentic pigments. Cyanidin 3-glucoside and cyanidin 3-rutinoside were obtained from bracts of *Euphorbia pulcherrima*[6] Wild. Peonidin 3-rutinoside from *Prunus domestica* L.[7]

Anthocyanin isolation[8] Fresh flowers were extracted with MeOH–HCl (97:3, v/v). The extract was chromatographed in BAW solvent for 24 hr. All purification steps were made by chromatographic methods in successive solvents (BAW, HOAc–HCl, 5% HOAc), the bands being cut out and eluted from the paper with MeOH–HOAc–H_2O (90:5:5, v/v).

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