

### Bergapten in *Dictamnus albus* L.

Among the plants with known photosensitizing action on the human skin, *Dictamnus albus* (*D. fraxinella*, gas-plant) is a well-known example. Contact of the plant juice with the skin, and the subsequent irradiation with ultraviolet light (366 nm), produces an obligatory phototoxic inflammatory reaction. Clinically, the condition is known as phytophotodermatitis. Plants causing this phenomenon chiefly belong to the families Umbelliferae and Rutaceae, and it has been known for some time that the responsible agents are linear (6,7-)furocoumarins (psoralen and derivatives)<sup>1</sup>.

Although phytophotodermatitis due to the contact with *D. albus* has been recognized by clinicians<sup>2,3</sup>, the presence of furocoumarins in extracts of this plant has so far not been demonstrated. In a study of the photosensitizing potency of a number of plants<sup>4</sup>, we identified bergapten as the major furocoumarin in *D. albus*.

Dried whole plants (obtained from The Cantonspark, Baarn, Holland) were extracted with a mixture of ethanol-water (1:2) at 70°C for 1 h, the extract was filtered while hot and allowed to cool. The pH was brought down from pH 6.5 to pH 1 with 4 *N* H<sub>2</sub>SO<sub>4</sub>, the solution heated for 90 min on a steam bath, allowed to cool, and extracted three times with petrolether (40-60). The organic layer was washed with 0.5% aq. NaHCO<sub>3</sub> and water, and dried over anhyd. Na<sub>2</sub>SO<sub>4</sub>; it was then taken to dryness *in vacuo*, the residue dissolved in excess absolute ethanol and filtered. The ethanol was removed from the filtrate *in vacuo*, the residue dissolved in CHCl<sub>3</sub>:petrolether (1:4),

and brought on a column of Al<sub>2</sub>O<sub>3</sub> (Brockmann) in the same solvent mixture. After percolation of CHCl<sub>3</sub>:petrolether (1:4) to remove inactive material, the column was eluted with CHCl<sub>3</sub>:petrolether (1:1). The colourless eluate was finally taken to dryness and the residue recrystallized several times from petrolether to give white needles, C<sub>12</sub>H<sub>8</sub>O<sub>4</sub>, m.p. 189° (uncorr.), identified as bergapten by UV-absorption spectrum, paper chromatography and its photosensitizing potency in skin tests. Available evidence indicates that at least part of this furocoumarin in the original extract exists as the glycoside of the corresponding furocoumarinic acid.

**Zusammenfassung.** Die Isolierung von Bergapten (5-Methoxy-Psoralen) aus *Dictamnus albus* L. wird beschrieben. Die photosensibilisierende Wirkung der Inhaltsstoffe dieser Pflanze nach UV-Bestrahlung auf die menschliche Haut ist hauptsächlich auf dieses Furocoumarin zurückzuführen.

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<sup>1</sup> L. MUSAJO and G. RODIGHIERO, *Exper.* 18, 153 (1962).

<sup>2</sup> C. L. CUMMER and R. DEXTER, *J. Am. med. Assoc.* 109, 495 (1937).

<sup>3</sup> G. SCHÄFFER, *Acta derm.-venereol.* (Stockh.) 30, 385 (1950).

<sup>4</sup> E. VAN DIJK and L. BERRENS, *Dermatologica* (Basel), in press.

### Ovule Development in the Carpeloid Stamens of *Solanum tuberosum* L.

The carpeloidy of stamens has so far been recorded only in *Nicotiana* hybrids<sup>1,2</sup>. The present note records the occurrence of the fasciated carpeloid stamens in an inter-varietal hybrid (D.7409) of *Solanum tuberosum* L. (Up-to-Date × E96) and endeavours to present the morphological and anatomical study of this abnormality.

**Morphological observations.** The normal potato flower consists of a five gamosepalous calyx, five gamopetalous rotate corolla, five basifixed anthers and a bicarpellary syncarpous superior ovary.

In the present case, the calyx and corolla of the flower were normal. The anthers were five in number but irregular in size and two or three of them showed fasciation (Figure 1). From the base of the anther filaments arose club-shaped filiform staminal appendages projecting slightly beyond the anthers (Figure 1). In most of these cases the anthers were made up of only spongy tissues. But in some flowers anthers were light yellow in colour and contained empty and shrivelled pollen grains. In many of the flowers the styles were thickened. In some it looked as if two or more styles had fused together (Figures 1 and 2). The stigmatic surfaces in these cases were broader and spongy compared with the normal ones.

**Anatomical observations.** Anatomical studies showed that: (1) The development and differentiation of female and male parts proceeded simultaneously, suggesting

that the factors responsible for the differentiation and growth of both of these organs act simultaneously.

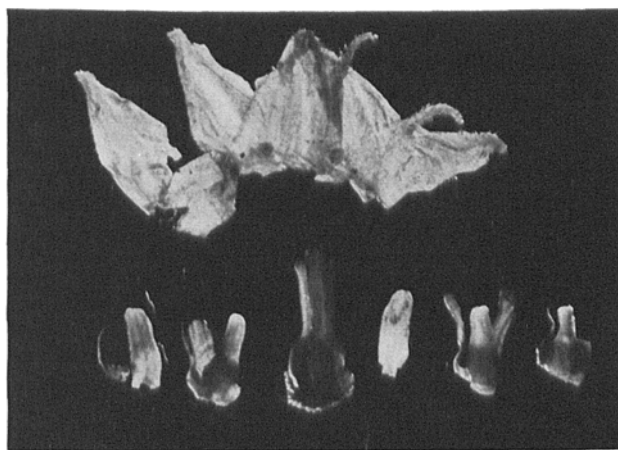


Fig. 1. Morphological variation in floral parts of a carpeloid flower (×10).

<sup>1</sup> N. R. BHAT and K. V. KRISHNAMURTY, *Sci. and Cult.* 21, 746 (1956).

<sup>2</sup> K. V. KRISHNAMURTY and K. APPA RAO, *Curr. Sci.* 21, 23 (1960).