

A RAPID METHOD FOR IDENTIFYING THEBAINE-RICH PAPAVER BRACTEATUM

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P. bracteatum (Chromosome number $2n = 14$) is a potentially important source of opiates (Fairbairn, 1976) but there has been considerable difficulty in distinguishing this thebaine-rich species from the closely allied P. orientale ($2n = 28$) and P. pseudo-orientale ($2n = 42$) and their numerous cultivated hybrids, etc. as botanical characters show considerable overlap. Quantitative analysis of the latex for thebaine is an obvious pragmatic test, but it may take almost 2 years from seed sowing to formation of capsules for testing. We have therefore devised a method based on measuring stomatal length a few weeks after seed germination. Goldblatt (1974) used stomatal lengths based on vegetative leaves, but the mean lengths overlapped badly and we found they varied with age of the leaf. Our method uses cotyledons at a specified physiological age, a further advantage being that no trichomes are present to interfere. Seeds of 7 collections of authenticated P. bracteatum, 4 of P. orientale and 4 of P. pseudo-orientale were germinated and at the stage when the second pair of true leaves were just appearing cellulose acetate impressions were made of the cotyledons and stomatal lengths measured. About 5 plants from each collection were used and 20 stomata measured from each. Chromosome counts from root material were also made by Miss C. Brighton, Jodrell Laboratory, Kew, and the alkaloidal spectrum of the seedlings determined by t.l.c.

Over 1200 stomatal measurements were made and the data fed into a computer. Statistical analysis showed that three homogeneous populations, which were significantly distinct, existed and corresponded to the three species. The mean for P. bracteatum (614 det.) was $58 \mu\text{m}$ s.d. 6.89; P. orientale (300 det.) was $74 \mu\text{m}$ s.d. 9.86 and P. pseudo-orientale (230 det.) was $84 \mu\text{m}$ s.d. 11.40. If therefore 25 determinations of stomatal lengths made from 5 different seedlings are made, the means would fall into the following ranges ($P = 0.95$); P. bracteatum (55.5 to 60.5); P. orientale (70 to 78) and P. pseudo-orientale (79.5 to 88.5). The method therefore clearly distinguishes P. bracteatum seedlings from those of the other two species. However there is a slight chance of overlap of results between the latter two and this was also seen with the chromosome counts as they corresponded to stomatal lengths for all varieties of P. bracteatum but did not always so correspond with P. orientale and P. pseudo-orientale. The alkaloidal pattern of the seedlings was not a reliable indicator of species as numerous alkaloid spots appeared without any recognisable pattern.

Fairbairn, J.W. (1976). *Planta Medica*, 30, 26-31.

Goldblatt, P. (1974). *Ann. Missouri Bot. Gard.*, 61, 264-296.