NOTES ON BUDDLEIA I: POLYPLOID PATTERN IN B. COLVILEI

J. KEENAN

The chromosome counts made in *Buddleia* by Moore (1947, 1960 & personal communications), Norman (1967), Janaki-Ammal (1954) Keenan (unpublished) and others have revealed in plants of known wild origin a range in ploidy from the diploid 2n = 38 through to 24-ploid with 2n = 456. In all, some 60 species from an estimated genus total of 150 have been counted, many of these from two or more introductions widely separated in space and time. With the exception of *B. colvilei* Hook. f., all examined species have displayed a constant degree of ploidy.

B. colvilei is found throughout Sikkim and Bhutan with outliers in the border areas of Nepal and Tibet. It is one of the most distinct species of known buddleias, remarkable in this genus for the constancy of its diagnostic features. No gross morphological grounds appear to exist for recognition of subspecific taxa within the species.

It was thus of particular interest to find that there are at least three chromosome races of *B. colvilei*: an octoploid 2n = 152; a 16-ploid 2n = 304 ca. and a 24-ploid 2n = 456 ca. The stocks examined were:—

B. colvilei '*Darjeeling*'	2n = 152	Janaki-Ammal (1954)
B. colvilei	2n = 304 ca.	Moore (1947)
B. colvilei '*Howth Castle*'	2n = 456 ca.	Keenan

Unfortunately the provenance of these introductions is unknown but they all may be of wild origin. In cultivation, they range in hardiness from the tender octoploid through the 16-ploid to the very hardy 24-ploid.

At Edinburgh, the 16-ploid and 24-ploid plants are self-sterile but cross compatible with one another. Seeds from such crosses were freely produced and had a high germination rate and a number of young plants have been raised. When counted these appeared to be 2n = 380 ca. (i.e. intermediate between the parents) but the preparations were unsatisfactory and it is hoped that more satisfactory results may be obtained in the future. *B. colvilei* may be crossed with other species but so far only as the male parent. It is suspected that probably its style length is too long to permit most other pollens to reach the ovary.

In the course of the study, observations on the pollination mechanism of the species were made. Both the 16- and 24-ploid plants displayed an interesting feature hitherto observed nowhere else in the genus, although the fact that these forms are self-sterile leaves doubt as to the biological position. In many flowers shortly before anthesis, when the corolla lobes are still tightly inrolled, the robust style pushes through and grows to some 6 mm above the apex of the unopened corolla. At this stage the stigmatic surface is viscous and clearly receptive. A few days later the corolla lobes expand and reflex whilst the anthers are still immature. Within three days the anthers dehisce, the pollen hanging from each anther cell in long viscous threads. The corollas which are borne in a pendulous fashion then become speedily deciduous and in dropping fall on to and slide over the styles

depositing liberal quantities of viable pollen on the still receptive stigmatic surfaces.

A note on techniques may here be appropriate. Since such high chromosome numbers are involved the counts are obviously difficult to ascertain and the writer was particularly grateful to Mrs. Williams, then cytologist at the Scottish Plant-Breeding Station, not only for her confirmation of his 24-ploid count but also for demonstrating the basic technique through which it was obtained. An account of a modified version follows.

Root tips are placed in alpha-bromo-naphthalene and refrigerated at 3 °C for 1½ hours. Individual root tips are placed in a watch glass and the alpha-bromo-naphthalene filtered off. The watch glass is ¾ filled with 1½% acetic-orceine (the solvent of which is 45% glacial acetic). When stained dark enough, a drop of 10% HCl is added and the watch-glass gently heated. The root tip is then placed on a slide, surplus HCl and acetic-orceine filtered off and replaced with ¾% acetic-orceine. The cover slip is placed, tapped with a match, gently heated for two seconds, then firmly pressed out with filter paper. The slide is then sealed with rubber solution or else the technique of Moore (1960) is used in which by running in lactic acid under the cover slip not only is viewing improved but the preparation need not be sealed.

References

JANAKI-AMMAL, E. K. (1954). The Cytogeography of the genus Buddleia in Asia. *Science and Culture* 19:578–581.

MOORE, R. J. (1947). Cytotaxonomic studies in the Loganiaceae, I. *Amer. Jour. Bot.* 34:527–538.

—— (1960). Cytotaxonomic notes on Buddleia, I. *Amer. Jour. Bot.* 47: 511–517.

NORMAN, E. M. (1967). The Genus Buddleia in North America. *Gentes Herbarum* 10:47–114.