Curr. Sci. 39 1–2 (1970)

The pelargoniums

SIR C V RAMAN

ABSTRACT

The spectra exhibited *in vivo* by pelargoniums of various colours, as also the absorption spectra of their acetone extracts have been studied. The colouring material is the same in all cases, but it is present in widely different quantities.

Brilliantly coloured flowers appearing in clusters at the end of terminal stalks,—and there may be a dozen or more such clusters carried by one plant—make the pelargonium a great favourite with gardeners. The individual plant being itself of no great height or spread, it can be conveniently grown in pots of modest size. Pelargoniums are to be found in extensive use as window-box plants for town houses in the cooler climates of the world. These plants (which are commonly called geraniums) do not thrive well in the hot plains of India, but the climate of Bangalore appears to suit them excellently. A hundred pots disposed at regular intervals along the boundary of a garden and kept in condition make a magnificent display of colour. The pots should be raised above the ground by placing them on bricks to prevent entry of larvae coming up from the earth.

There are several distinct species of pelargonium which may be readily distinguished from each other by the shape and feel of the leaves. *Pelargonium inquinans* has leaves which are almost circular, soft to the touch and have undulating edges. *Pelargonium peltatum*, also known as ivy-leaved geranium, has trailing slender stems, and polished, thick, dark green leaves. The pelargoniums seen at Bangalore fall into five colour groups. The ivy-leaved plants bear flowers which are a rich red, approaching crimson. The soft-leaved species usually exhibit flowers of a brilliant scarlet colour. There are also plants bearing numerous clusters of flowers which are a bright rose-pink and others with flowers of an orange hue. Some plants are also to be seen with flowers which are basically white but have red margins. The delightful scent of the leaves of some geraniums also deserves mention.

Viewing a cluster of the flowers held in sunlight through a pocket spectroscope reveals the progressive change in the character of the spectrum as we pass from the case of the red flowers to the scarlet and then to the orange. With the red flowers, there is a practically complete extinction of all wavelengths less than 600 mμ in the light which emerges from the petals after internal absorption and

diffusion. The limit shifts to 580 mμ in the case of the scarlet flowers and to 550 mμ for those which are orange. On the other hand, the flowers which are a bright rose-pink in colour do not exhibit a complete extinction of any part of the spectrum. There is a marked weakening of the spectrum in the wavelength range from 500 to 600 mμ which includes the green and yellow sectors, but there is no observable absorption in the region of wavelengths greater than 600 mμ. Wavelengths less than 500 mμ, in other words, the blue regions of the spectrum, remain visible though with appreciably reduced intensity. The situation is thus very similar to that observed with roses of different colours and discussed in a recent issue of *Current Science.*

The red flowers of the ivy-leaved pelargonium readily yield up their colour when placed in a glass beaker and shaken up with sufficient acetone to cover the petals. The acetone extract shows at first the same red colour as the flowers themselves. But the colour of the extract fades away rapidly in the course of a few minutes and soon disappears completely. The progressive fall in absorption can be followed with a 5 cm column of the extract held against a brilliant field of white light and viewed through a spectroscope. The absorption which at first is complete for all wavelengths less than 600 mμ is observed to diminish over the whole range, and especially in the region between 550 and 600 mμ which is normally the brightest part of the spectrum. Wavelengths less than 500 mμ begin to make their appearance and progressively become more intense. Finally, the entire spectrum comes through with no observable weakening.

Acetone extracts may also be obtained with the flowers of other hues and the progressive falling off in colour and absorptive power may similarly be followed. But the effects are much less striking than in the case of the red flowers.

Since, in all cases, the absorption by the flowers of pelargonium appears in the yellow and the green sectors of the spectrum, we are justified in recognising the material responsible for the observed colour as florachrome B. It is also evident that the colour variations observed are due essentially to the quantity of the pigment present in the petals being substantially different in the different cases.