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ROYAL BOTANIC GARDENS, KEW.

BULLETIN

OF

MISCELLANEOUS INFORMATION.

No. 8]

[1916

XXXIV.—THE EXHALATION OF SCENT BY THE  
FLOWERS OF *MICHELIA FUSCATA*.

L. A. BOODLE.

The flowers of *Michelia fuscata*, Blume (*Magnoliaceae*), are strongly scented at times, their odour being very similar to that of amyl acetate.

Observations have been made by Mr. W. L. Lavender on a plant of this species in the Temperate House at Kew, in relation to the scent of the flowers, and the results obtained by him are given below.

Flowers were examined on several days, five or six times each day from 6.30 a.m.\* until 5.30 p.m. The records as to scent are set out separately for each day, beginning only at 11.30, because scenting of flowers was not noticed before that time. Notes on atmospheric conditions are added.

May 1†—Bright at 9.30.			May 3‡—Bright, 6.30–5.30.		
11.30—Dull, warm	...	...	Slight scent.	11.30—Slight scent.	
2.30—Bright...	...	...	Strong scent.	1.30—Fairly strong.	
5.30— „ ...	...	...	Less strong.	2.30—Strong.	
				5.30—Slight.	
May 4—6.30–9.30—Dull, wet.			May 5—Bright, 6.30–5.30.		
11.30—Dull	...	...	No scent.	11.30—Slight scent.	
1.30—Bright...	...	...	Slight scent.	2.30—Strong.	
5.0 — „ ...	...	...	Strong.	5.30—Fairly strong.	

\* The experiments were made in the year 1915 and the times are therefore normal.

† A flower, picked off at 6.30 a.m. and placed on paper in a rather warmer atmosphere, was strongly scented at 11.30 a.m.

‡ A flower, picked at 6.30 a.m. and treated as in the experiment of May 1st, was strongly scented at 11.30 a.m., but had lost all its scent by 4 p.m.

May 6—6.30–9.30—Bright.				May 18—6.30–5.30—Dull, cold, wet.			
11.30—Bright, close ...			Slight scent.	11.30—No scent.			
2.30—	„	„	Strong.	2.30—	„	„	
5.30—	„	„	„	3.30—Slight scent.			
				5.30—	„	„	
May 20—Dull, showery. No scent before 2 p.m. and then only slight.							

The conclusions arrived at are as follows. On bright days the scent is strongest from 2.30 p.m. to 5 p.m., and then gradually diminishes. On dull days the scent is not so strong as in bright weather, and exhalation begins later.

When the morning is wet and cold, and the afternoon bright, the scent develops later and apparently remains later.

Flowers picked off and kept at a rather higher temperature on paper become scented about an hour before those left on the tree.

With the object of obtaining further data as to the influence of external conditions on the production of scent by the flowers of *Michelia*, some experiments were made in the Jodrell Laboratory. Cut flowers, with their stalks placed in water, were used, and in most cases four lots of three or four flowers each were arranged under different conditions, *e.g.*, one set of flowers in the dark, one in shade,\* another in sunlight, and another in a very damp atmosphere,† either in sunlight or in shade.

The results of the experiments show that light, and moisture have a marked influence on the exhalation of the scent, which is produced only during a few hours at a time.

The scent is given off almost entirely by the perianth-leaves, but in two cases a very slight scent was detected in the central part of the flower (stamens and pistil), after the perianth leaves had fallen off. The scent of a flower may recur on two or three days, and besides this the perianth-leaves may become scented on the following day after they have dropped, or even on the second day.

The experiments were mostly begun soon after 10 a.m., the flowers being then without scent. The earliest development of scent was observed shortly before 11 a.m.

Similarly treated specimens from a batch of flowers of apparently the same age often behave somewhat differently. It is necessary therefore to repeat an experiment three or four times when only small numbers of flowers are used.

Damp air, as compared with dry, causes earlier exhalation of the scent. This was tested in sunlight and in shade, and the differences observed were from half-an-hour to one hour in the sun, and from half-an-hour to two hours in the shade. The favourable influence of moisture was shown also by the fact that damp air gave a greater proportion of scented and also of

\* For the shade experiment the flowers were placed close to a north window.

† The flowers in this case were put under a small bell-jar in which the air was kept near saturation-point by means of damp blotting-paper.

strongly-scented flowers. The combined result of five experiments was:—In damp air, 5 flowers with strong scent, 3 fairly strong, 2 slight; in dry air, 2 fairly strong, 4 slight. Three of these experiments were made in shade and two in sunlight.\*

A comparison of the behaviour of flowers in sunlight and in shade shows that sunlight favours the production of scent, both as regards earlier occurrence, number of flowers, and strength of odour. In four experiments the difference of time was from half-an-hour to two hours, and the numbers of flowers were:—In sun, 2 with strong scent, 8 fairly strong, 2 slight; in shade, 1 fairly strong, 6 slight.

Flowers kept in the dark were found to remain unscented in most cases. In experiments made on five days, when strong or fairly strong scent was produced in light, flowers in the dark did not become scented except on one day, and then only slightly.

In relation to the production of scent, the following appears to be the sequence of conditions from favourable to unfavourable: sun and damp, sun, shade and damp (often about equal to sun), shade, and lastly darkness.

The shade temperature in the Laboratory was 52° F. on the coldest day, and 70° F. on the hottest. These differences probably had some influence on the production of scent. A detailed comparison of the results belonging to different days would not, however, bear this out, one reason being that the brightness of the light varied to a great extent with the temperature. It may be noted, however, that on the hottest day, though this was not quite the brightest, a slightly earlier exhalation of the scent was recorded than on any other occasion, and that decided lateness of scent was observed on two of the coldest though fairly bright days.

A few experiments were made with temperatures above and below the normal range. In one case, flowers were kept in air cooled by ice to a temperature varying from 40° F. to 50° F., other flowers being in the Laboratory air at about 70° F. Exhalation of scent began at 11.30 a.m. from the flowers at the higher temperature placed in damp air, and at 12.30 p.m. from those in dry air, but in the cooled air no scent had developed by 2.30 p.m. The ice was then removed, and the flowers from the cooled air were placed in sunlight, with the result that two of them became slightly scented by 4 p.m. On experimenting with flowers on two or three days in a greenhouse in darkness it appeared that a temperature of 75° to 80° F. slightly diminished the unfavourable influence of darkness on the production of scent, *i.e.*, as compared with the lower temperatures of the Laboratory experiments.

In one case heat was applied to some flowers towards the end of the day to see whether the scent would be revived. There were three lots of flowers, which were placed at 11 a.m. in sunlight, shade and darkness respectively. Scent was noticeable at noon in the sunlight, and at 12.30 p.m. in the shade, but

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\* These results may be due in part to a possible increase of the olfactory action of a given amount of the scent when distributed in damp air.

was not developed by the flowers placed in the dark. By 8 p.m. it had practically ceased in both lots of flowers exposed to the light, and entirely before 9 p.m. The three lots were then put into an oven with a temperature of 92°–100° F., and kept there until 11 p.m., but in no case was any scent developed.

An interesting feature was noticed in some of the experiments. When the same flowers were used on two successive days, it was found that an after-effect of the behaviour of the flowers on the first day may sometimes be recognised on the second day. For instance, in one experiment, flowers placed in sunlight became strongly scented, while others placed in the dark produced no scent. On the following day both lots were exposed to sunlight, and the flowers which had been in darkness on the first day became scented two hours earlier than the others. Another experiment gave a similar result with a difference of two hours and a half, and with stronger scent in favour of those flowers which had previously been in the dark.

In explanation of this phenomenon it is suggested that possibly a non-volatile substance, which yields the scent under certain external conditions, accumulates gradually (or chiefly during the night) in the cells, but becomes exhausted during energetic exhalation of scent.

The exhalation of scent probably takes place chiefly through the stomata of the perianth-leaves, but, in view of the favourable effect of damp air, it is maintained that the manufacture and not only the exit of the scent is concerned in the phenomena observed.

## XXXV.—DECADES KEWENSES

PLANTARUM NOVARUM IN HERBARIO HORTI REGII

CONSERVATARUM.

DECAS LXXXIX.

881. *Rosa* (**Cinnamomeae**) *elegantula*, Rolfe; affinis *R. sertatae*, Rolfe, ramis juvenilibus copiose et graciliter aciculatis et floribus duplo minoribus facile distinguenda.

*Frutex* ramosus, mediocris; ramuli subglabri, saepissime copiose aculeati, rarius subinermes. *Folia* conferta, 5–8 cm. longa, 7–9-foliolata; rhachis sparse glandulosa et aculeolata; foliola subsessilia, elliptica vel ovato-elliptica, obtusa, acute et simpliciter dentata, rarius subduplicato-serrata, utrinque glauca, 1–2 cm. longa; stipulae adnatae, anguste oblongae, obtusae vel subobtusae, minutissime ciliato-glandulosae, 5–6 mm. longae. *Flores* speciosi, saturate rosei, 2.5–3 cm. diametro, in ramulorum brevium apicibus solitarii vel pauci; pedunculi 2 cm. longi, laeves. *Receptaculum* anguste ovoideo-oblongum, laeve, 5–6 mm. longum. *Calycis* lobi ovato-lanceolati, caudato-acuminati, interdum subfoliacei, puberuli, minutissime ciliolati, rarissime glandulosi, circiter 1 cm. longi, patentes. *Petala* late obcordata. *Filamenta* glabra, 2–3 mm. longa, antheris aureis. *Styli* villosi, in columnam 2 mm. longam cohaerentes.