PREVENTION OF FLOWERING IN SUGARCANE

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FLOWERING in commercial sugarcane crops is undesirable; with floral initiation, vegetative growth of the apical meristem ceases; the leaf-crown dwindles into short-blades, thus diminishing its fodder value. Later, the top portion of the cane becomes pithy and, due to the loss of apical dominance, develops side shoots. Finally there is a gradual drop in sugar content. Non-flowered canes are therefore preferred both by the grower and the sugar manufacturer.

In varietal selection, the tendency to blossom is a negative attribute. However, there are some good commercial varieties, which flower somewhat freely; if the flowering of these varieties as crops can be prevented, these varieties may become more profitable or acceptable than they are now.

Since the switch-over of the apical meristem from the vegetative to the reproductive phase is caused by hormonal changes and these in turn are brought about by the perception of the photoperiodic stimulus by the plant, flowering can presumably be prevented by an appropriate interference with one or other of the links in the process of floral initiation; *i.e.*, either (*i*) by avoiding or circumventing the stimulus itself, *viz.*, the photoperiod; (*ii*) by preventing the perception of the stimulus by the plant, or (*iii*) by the action of suitable chemicals on the pre-flowering metabolic changes. Studies of Cajlachjan (1936, 1945), Borthwick and Parker (1938) Withrow *et al.* (1943), Hamner and Naylor (1939), Greulach (1942) and others have clearly indicated that the green leaves are the organs of perception in this case. Since the use of chemicals and interference with the photoperiod are *prima facie* not likely to be commercially acceptable, efforts were made in our experiments in the direction of third alternative, namely, elimination of the perception mechanism through defoliation of plants.

It was found by periodically dissecting the leaf spindle that under Lucknow conditions, floral initiation takes place in early October in the majority of cases. It was presumed from this that the critical photoperiod, its perception by the plant and the connected metabolic changes in the plant would very likely occur in the 2 or 3 weeks preceding this date; accordingly, defoliation was done in different treatments in successive weeks from end-August to early-October, employing two heavily-flowering varieties, Co. 1207 and Co. 1062. In the former, about 450 stalks were treated; in the latter about 850. Defoliation was effected by cutting off the blades at the dewlap.

TABLE I

Defoliated on		Percentage of flowering and short-blade stalks at harvest		
		Spindle cluster including the topmost dewlap blade removed		Spindle cluster and three leaves removed
		Co. 1062	Co. 1207	Co. 1207
August	12 ..	55·3	..	..
	27 ..	54·5	..	..
September	2 ..	8·7	..	..
	5 ..	..	26·7	..
	8–9 ..	5·0	20·2	15·2
	14–15 ..	1·7	4·3	2·6
	20 ..	2·9	..	..
	23 ..	..	8·8	0·9
	26 ..	2·4	..	..
October	2 ..	15·7	..	..
	8 ..	46·6	..	..
Control	..	53·0	55·2	55·2

The results (Table I) indicate that defoliation from 14th to 26th September has almost entirely suppressed flowering; the treated stalks remained vegetative, and provided the normal full leaf-crowns at harvest.

Further the treatments show a clear gradient in the suppression effect, the percentage of flowering-*cum*-short-blade stalks to total number of stalks falling with the defoliations of successive weeks from end-August up to the 3rd and 4th weeks of September when the maximum suppression occurred; later defoliations were progressively ineffective. The third observation is that the critical defoliation date is the same for both the varieties.

Borthwick and Parker (1940), Gerhard (1940), Ullrich (1939), Naylor (1941), Moskov (1937) and others have inferred from their studies that young expanding leaves of plants are insensitive to the photoperiodic stimulus, while the sensitivity of the fully unfurled leaves depends on the age of the leaf, the youngest being the most sensitive and the oldest mature leaves being relatively insensitive. In our experiments on Co. 1207, two degrees of defoliation were tried: (*i*) removal of spindle cluster including the blade of the topmost dewlap and (*ii*) removal of spindle cluster and three more blades below it. The results (Table I) suggest that the

young expanding blades of the spindle cluster *plus* the blade of the topmost dewlap constitute the principal sensitive organ for the perception of photoperiodic stimulus; the sensitivity however extends to some extent to the next lower three or four leaves also. Apparently, there is a sensitivity gradient in the leaves; this is being investigated in further experiments.

The results indicate a clear possibility of keeping sugarcane crops in the vegetative condition by adopting a cultural practice which is obviously adoptable under Indian conditions, even though in Hawaii it has not been found practicable on a plantation scale.

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INTERNATIONAL CONTROL OF INVESTIGATIONS OF RARE METEORITES

IN recent years the study of meteorites has rapidly increased and, in the hands of investigators such as Urey, Anders, Wiik, Vinogradov and others, has thrown much light on the composition and origin of the solar system and of the planets. Last year, through the work of Mason on hydrous silicates in meteorites, interest has concentrated on the rarest form of meteorites, those which contain carbonaceous material. It follows from Mason's results, as well as from the earlier analyses of material by G. Mueller, that carbonaceous meteorites, unlike all other types, had never been subjected to high temperatures since their formation and that they might well contain samples of the raw materials from which life may have been formed on larger planets. On March 16, this hypothesis was given a new turn by the announcement at the meeting of the New York Academy of Sciences that Prof. B. Nagy, Dr. W. Meinschein and Dr. Hennessy had, by using mass spectroscopic and X-ray methods, found in the carbonaceous material from the meteorite which fell near Orgeuil in France on May 14, 1864, paraffinoid hydrocarbons characteristic of living organisms and hence had, in the opinions of these investigators, provided proof for the existence of life on its presumed parent body. This view is unlikely to go unchallenged, but whatever the final consensus of opinion, the crucial importance of this study of the carbonaceous meteorites is now evident (*see also Science Notes*, p. 245)

The great publicity deservedly given to these observations and deductions has focused the attention of scientists in many countries on the carbonaceous meteorites. Paradoxically, the result may well be, unless appropriate steps are taken in time, to bring the researches to a rapid end by destroying the irreplaceable material on which they are based. There is known to be only some 30 kg. of well-attested carbonaceous meteorites in museums. More, but not much more, may be in the hands of dealers or may be brought to light in other ways. Already these rare bodies are being examined in a dozen or more laboratories, each with a different objective and by methods which render the material useless for further study. This can only result in the exhaustion of the stock unless prompt measures are taken to ensure international co-operation similar to that in the various sections of the International Geophysical Year in the analysis of meteorites by different but complementary methods. The appropriate body for this is clearly the Committee on Space Research of the International Council of Scientific Unions, which, by a slight extension of its terms of reference, might cover *bodies coming in from outer space as well as* those going out into it. It is hoped that at the forthcoming meeting of the Committee at Florence, the matter can be discussed and appropriate measures taken in time to secure that the maximum of information is obtained from meteorties with the minimum of destruction. —(*Nature*, 1961, 189, 967.)