

as two, by Sinoto and Yuasa³ as four and by Kater¹ as probably eight. Badian is criticized (Guilliermond⁵) on the ground that his diagrammatic illustrations do not fit in with his own or Guilliermond's photomicrographs. Our uniform and consistent results⁶ indicate that for the strain (S.C. 9, N.C.T.C.) investigated by us the chromosome number is two. This raises the question whether the different chromosome numbers given by various authors may not be due to studies of different races passing under the name of *S. cerevisiae*? The numbers given by Sinoto and Yuasa and Kater are multiples of that given by Badian. Were they dealing with tetra and octoploids? If so, the results are not strictly comparable.

The previous workers must have seen what they described. Kater¹ while referring to his previous work on yeasts considers that since his success depended "to a certain extent on accident" it could not form the basis for a general acceptance of the conclusion by all workers until others manage to duplicate the results⁷.

We have tried Bouin-fixation and subsequent staining with Heidenhain's hæmatoxylin and find that the above technique reveals the two chromosomes seen in Carnoy-iron-hæmatoxylin preparations. It is not at all necessary that the cells should contain picric acid. Smears treated in the usual way would give good pictures of the chromosomes if the following precautions are taken.

- (1) Use of wort cultures.
- (2) Control of cultures in such a way that all cells are almost at the same phase of development.
- (3) Experimental determination of the time of division.
- (4) Fixation of wet smears.
- (5) Long staining with iron-hæmatoxylin.
- (6) Careful differentiation.

Our results suggest that the "accident" mentioned by Kater¹ is not the delicate balance between the dye and the acid but that the cells should be at some phase of the mitotic cycle. We cannot also agree with Henrici⁷ that "descriptions of details in morphologic structures less than 1μ in diameter should always be taken *cum grano salis*", since in our preparations no other structure is present in the cells to complicate the picture seen.

Why is it then, that even after filling up the "possible leak" in Kater's technique we see only two chromosomes, while Kater gives the number as possibly eight? Under the belief that Badian, Sinoto and Yuasa and Kater have been using different strains we carried out some experiments with acenaphthene. Polyploidy could be induced and on cytological examination of wort cultures after a few hours' treatment with the above chemical, one finds in every field cells with varying chromosome numbers. It appears, therefore, possible to produce a tetraploid or octoploid by controlling the time of treatment with acenaphthene. One curious fact which emerged from the preliminary experiments was the observation that the measurements of the chromosomes of the tetraploids need not agree with that of the diploids. Viewed in the light of

the above discovery, it appears probable that different observers have been investigating different races passing under the name of *S. cerevisiae*! If the above contention is substantiated, much of the genetical work on yeasts may have to be revised in the light of new facts revealed by cytology.

Our thanks are due to Mr. M. Sreenivasaya for his active interest and encouragement. One of us (M.K.S.) wishes to tender his grateful thanks to Messrs. The K. C. P., Ltd., Uyyuru, for the generous grant of a studentship.

Fermentation Technology Section,
Indian Institute of Science,
Bangalore,
February 2, 1945.

M. K. SUBRAMANIAM.
B. RANGANATHAN.

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ON THE PRESENCE OF AN OBTURATOR IN THE OVULE OF *PHYLLANTHUS NIRURI* L.

IN a short note on the development of the embryo-sac of *Phyllanthus niruri*, Maheshwari and Chowdry³ (1937) reported the occurrence of a normal eight-nucleate megagametophyte when some previous workers had reported a five-nucleate one. Incidentally we also recorded the presence of an obturator in the ovule—a fairly common occurrence in Euphorbiaceæ. Recently Banerji and Dutt² (1944), in a work dealing with the development of the female gametophyte of *Putranjiva*, *Trewia*, *Euphorbia* and *Phyllanthus*, agree that the embryo-sac is eight-nucleate but report their failure to find an obturator either in *P. niruri* or *P. urinaria*, and suggest that Maheshwari and Chowdry probably mistook "the nucellar beak of the second ovule for an obturator". It is added that "in longitudinal sections, the nucellar beak of the second ovule sometimes gave the appearance of an obturator but close examination always revealed its true nature".

Since this is quite contrary to our observations and as the old slides on which the original study was based were no longer available for study, I sectioned some material of *P. niruri* collected from Dacca and am able to confirm our original statement that an obturator is clear and unmistakable. This is in agreement with the previous observations of Arnoldi¹ and others made several years ago on *Ceramanthus* (= *Phyllanthus*) (see Schnarf,⁴ 1929, for literature). I am unable to offer any explanation as to why the obturator was missed by Banerji and Dutt² in their sections, but presume that their observations were made on non-median sections.

It may, therefore, be concluded that an obturator is present in *P. niruri* and is very

likely to be so in *P. urinaria* as well, although I have not examined the latter species myself.
Dacca University, P. MAHESHWARI,
March 5, 1945.

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**INHERITANCE OF FRUIT POSITION
IN A CHILLIE CROSS**

A PURE breeding strain of chillies I.P. 34, a prolific bearer with fairly pungent fruits from the Imperial Agricultural Institute, Delhi, was crossed with another pure strain, 'Yellow Wax', from Sutton & Sons, highly prized for pickles, with a view to evolve a type combining the size of the 'Yellow Wax' with the pungent and prolific bearing characters of I.P. 34. The fruits are erect in 'Yellow Wax' while being pendent in I.P. 34. The results of the crosses

The segregation observed is given in Table I. From the F₁ of the cross I.P. 34 and 'Yellow Wax' four-selfed phenotypes and seven-selfed ones from its reciprocal cross were grown as F₂ in the subsequent season. Segregation was observed in one family of the former and five of the latter cross. The data are given in Table II.

The only significant deviation of the expected from the observed frequencies is in family F₂-67 where the value of P exceeds 0.20.

A single factor is, therefore, involved in the expression of the fruit position.

Shaw and Abdur Rahman Khan (1928) have used position of the fruit as a diagnostic character in classifying chillies: Deshpande (1933) has shown this character to be governed by a single factor. Our observation is also in accordance with that of Deshpande. Pendent position of fruit is dominant to erect and T 34 may be designated PP for this character and 'Yellow Wax' as PP.

The cross reported above was originally made in 1940, by the Junior author, Babu R. S. Roy. We are grateful to Dr. R. H.

TABLE I

	I. P. 34 × Yellow Wax			Yellow Wax × I. P. 34		
	Pendant	Erect	Total	Pendant	Erect	Total
Observed	39	12	51	58	13	71
Expected	(3:1)38.25	12.75	51	53.25	17.75	71
	X ² = 0.59 P=0.80			X ² = 1.695 P=0.2		

TABLE II

Yellow Wax × I. P. 34						I. P. 34 × Yellow Wax			
Family	Pendant	Erect	Total	X	P	Family	Pendant	Erect	Total
F 2-42	15	4	19	0.159	0.7	F 2-10	23	9	32
F 2-57	19	6	25	0.013	0.9				
F 2-64	5	3	8	0.67	0.8				
F 2-66	22	9	31	0.269	0.7				
F 2-67	18	10	28	1.7	0.2				
Total observed	79	32	111				23	9	32
Expected (3:1)	83.25	27.75	111				24	8	32
	X ² = 0.868 P=0.5-0.3					X ² = 0.167 P=0.5			

regarding the position of the fruits are reported below.

In the F₁ of the cross 'Yellow Wax' I.P. 34 and I.P. 34 'Yellow Wax', the fruits were found to be mostly pendent with occasional erect early stages. From each of the above crosses two-selfed F₁ plants were grown as F₂. The segregation observed was into erect and pendent fruits, with a few cases of erect-pendent fruit position, the earlier stages being erect. The last type was included among the group of erect ones, since these fruits resembled that of the 'Yellow Wax' not only in being erect in the earlier stages but also in the later assumption of a pendent position owing to an increase in size and weight.

Richharia, Economic Botanist, Bihar, for providing us with facilities for this investigation.
Asst. Economic Botanist, Bihar, M. P. SINGH,
Senior Scientific Assistant, Botanical Section, R. S. Roy,
Sabour,
January 9, 1945.

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