A NEW SYNCHYTRIUM ON *PHASEOLUS MUNGO*

A VERY severe disease on *udid* (*Phaseolus mungo* L.) causing defoliation was noticed on the Government Farm, Jalgaon, East Khandesh in August, 1948. A reference through literature showed that no species of *Synchytrium* was reported so far on this plant and that those reported on other legumes differed a great deal and hence it is proposed to assign it a specific rank.

Synchytrium phaseoli Patel, Kulkarni and Dhande sp. nov.

Leaves are covered on both sides with quadrilateral to polygonal crusts, measuring 1–2 × 1 mm. when quadrilateral. Several crusts when limited by veins coalesce. Colour of crust on the upper surface is deep-brown while it is pale brown on the lower surface. Infection occurs rarely on petioles.

Resting sporangia many in a crust, but one in each host cell, spherical to slightly ellipsoidal, smooth, with thick dark brown wall, measuring 18·0-26·6 μ (average 22·8 μ) in diameter. Endospore spherical, olive brown, smooth, thick walled, 3·5 μ thick epispore.

On leaves and petioles of *Phaseolus mungo* L. (Urd bean), Jalgaon, India, August 1948.

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Synchytrium phaseoli Patel, Kulkarni and Dhande nec. nov.

Foliorum utraque facies cooperta costris quadrilateralibus vel polygonalibus, quadrilateralibus quidem 1 -2 × 1 mm. magnit. Plures costrae, cum venis limitantur, coalescunt. Costrarum color in facie superiore est fusce brunneus, in inferiore vero facie pallide brunneus. Infectio raro in petiolis invenitur.

Sporangia quiescentia plura in singulis costris, sed singula occurrunt in singulis plantae hospitis cellulis. sphærica ad tenuiter ellipsoidea, levia, crassis et fusce brunneis parietibus ornata, magnit. 18.0 –26.6μ (mediet. 22·8 μ) in diam. Endosporium sphæricum, olivaceo-brunneum, leve, crassis parietibus præditum ; episporium 3·5 μ crassum.

In foliis et petiolis *Phaseoli mungo* L. (Urd bean), in loco Jalgaon, India, mense augusto 1948.

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January 15, 1949.

A CASE OF SIMULTANEOUS MUTATION OF TWO INDEPENDENT GENES IN THE CHILLI *CAPSICUM ANNUUM* L.

THERE are several cases of spontaneous mutation involving a single gene, but cases of simultaneous mutation of wo tor more genes occurring spontaneously are perhaps rare. A case of simultaneous mutation of two independent genes, one determining the colour of ripe fruit and the other plant habit, has been recorded in the chilli crop in this Division. The colour of ripe fruit, red or yellow, is only a varietal difference, the bulk of the commercially grown chillies being red fruited. In the chilli collection in this Division both red and yellow fruited varieties are present. As regards compact plant habit with fruits appearing in clusters no variety in the collection of this Division possessed these characteristics, nor is the author aware of the existence of such a variety. A plant with such characteristics, which arose as a mutant, was first observed in this Division and described as "Bunch" mutant (Deshpande, 1940).

Genetical investigations in this crop have shown that red colour of fruit is a single dominant to yellow and normal plant habit dominant to compact habit (Deshpande, 1933, 1941).

In the year 1943-44 in the progeny of a single, unselfed plant of N. P. 34, which has red fruits and normal plant habit (Shaw and Khan, 1928), plants with compact habit and plants with yellow fruits also were observed. On taking counts the frequencies were found to be as follows:—

	Normal habit		Compact habit		Total
	Red fruited plants	Yellow fruited plants	Red fruited plants	Yellow fruited plants	
Frequencies observed	12	3	4	1	20
Frequencies calculated on 9 : 3 : 3 : 1 ratio	11·25	3·75	3·75	1·25	20

It may be seen from the data that the agreement between the observed and the theoretical frequencies on the basis of two factor difference is very close.

That this segregation is not the result of a natural cross with the "bunch" mutant recorded earlier (Deshpande, 1940) or with a yellow fruited type is evident from the fact that the fruit size and shape in all the plants of the segregating progeny were uniform, whereas the "bunch" mutant referred to above has much longer fruits, besides being red fruited and the fact that no yellow fruited type in the collection has the size and shape of the fruits of the mutant.

This therefore is a clear case of two independent dominant genes mutating simultaneously to their recessive condition. The parent plant of the segregating progeny of N.P. 34, which had normal plant habit and red fruits, must have been heterozygous for the two genes controlling the two characters involved. This heterozygous condition may have resulted from the mutation of the dominant alleles for normal habit and red colour of ripe fruit.

From this segregating progeny pure breeding plants with compact habit and red and yellow fruits respectively have been isolated and added to the collection of chilli varieties maintained at this Division.

Indian Agricultural Research Institute, New Delhi,
March 7, 1949.

R.B. DESHPANDE.

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INDEX FOR EARLINESS IN SUGARCANE

RIPENING in sugarcane is a vegetative process unlike in the case of grain crops in which latter sexual processes are involved. In the former, ripening is largely season bound but the degree of ripening depends upon the age of the shoot, soil and climatic conditions. Active growth of sugarcane more or less coincides with the monsoon periods, and ripening starts with the slackening of growth and the onset of cold dry months. There are varieties which ripen early or late. Thus, ripening may be said to be a resultant of the external as well as internal factors.

Among the external factors which bring about ripening may be mentioned (*i*) Soil type, (*ii*) Soil moisture, (*iii*) Fertility status of soil, (*iv*) Manures applied and (*v*) Cultural practices. There is abundant literature discussing the effects of these factors on ripening, and hence for the sake of brevity they are not mentioned here.

Regarding the internal factors very little work has been done. Study of varietal differences in regard to earliness and degree of ripening have been a regular feature of the work of Sugarcane Research Stations everywhere. Clement and Kubota (1943) from Hawaii studied the problems of primary index and fixed upon the total sugar level of the elongating cane sheaths expressed as per cent. of dry matter. But Borden (1945) reported wide range of variability of this primary index from his studies on replicated plots. Hartt (1939) and Clements and Kubota (1942) have reported on the moisture contents of sugarcane. These authors discussed the moisture content in different parts of the plant and the elongating leaf-sheath was chosen as reliable tissue to be used as moisture index.

Growth of cane by dry weight method was recorded by me in respect of two replicated field experiments at Anakapalle during the season 1948-49. Fortnightly increases in dry matter and moisture % in leaf, sheath, growing spindle and stem were recorded from July to February. The variants in the two aforesaid experiments are: *Ratoon experiment*:— Variety Co. 419. (*a*) ratoon crop, (*b*) plant crop. *Monthly planting experiment*:—(*a*) Co. 419 planted in the months of (*i*) March, (*ii*) April, (*iii*) May, (*iv*) June (*b*) Co. 475 planted in the same months as Co. 419. The data collected are too elaborate to be reported here but data for two typical periods are furnished below (see Table),

A perusal of the entire mass of data shows that the moisture content is closely associated with the ripeness of cane. Corresponding analysis of juice was not done for obvious reasons that such a correlation was not anticipated before. But this correlation is inferred from the fact that ratoon crop and Co. 475 on one hand and the earlier plantings in the case of varieties on the other, are earlier in maturity than the plant crop and late plantings respec-