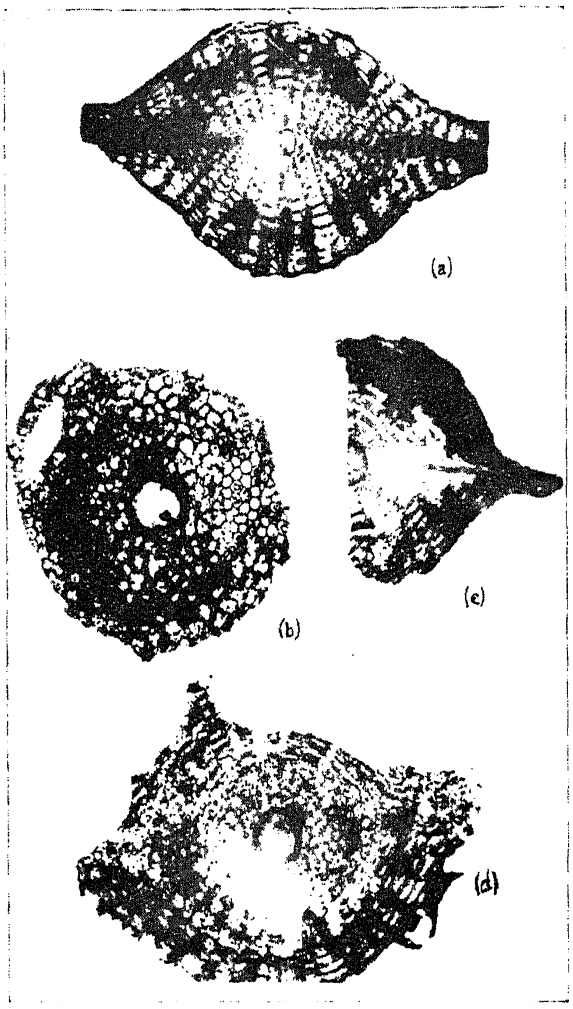

FIG. 1

(*a*) Meridian section, and (*b*) Equatorial section of *L.* (*Lepidocyclina*) sp. nov. (A.-form). × 25. Loc.—Kimamlee, near Surat. (*c*) Meridian section, and (*d*) Equatorial section of *L.* (*Nephrolepidina*) *sumatrensis*, Brady, var. nov. (A.-form). × 25. Loc.—same as above.

species from Sumatra is very marked and the differences are only of a varietal degree. Prof. H. Douville,[3] in his scheme of classification for the Far-East, has noted that small *Nephrolepidina* of the type represented by the species *sumatrensis* as characteristic of the Burdigalian stage. The agate conglomerates and the associated sandstones may, therefore, be assigned to the corresponding Indian stage in the Gaj series.

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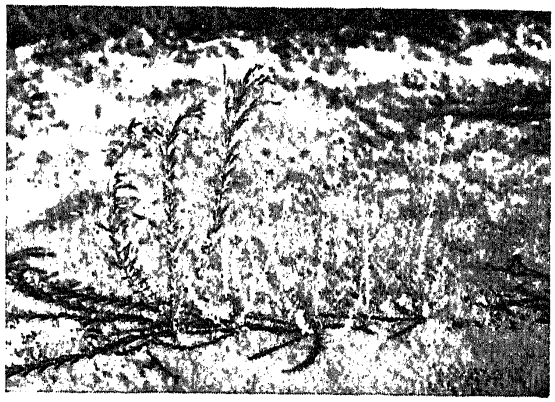
[1] Lt.-Col. L. M. Davies has recently described *L.* (*Polylepidina*) *punjabensis* Davies, from the Ranikot (Paleocene) beds of the Punjab Salt Range (*Pal. Ind.*, n.s., 1937, 24). This appears to be a very unusual occurrence. According to Vaughan (*Biogeographic Relations of the Orbitoid Foraminifera*, 1933), *Lepidocyclina* and its allies appear to have originated in America during middle and upper Eocene time and migrated from there to other parts of the world. Vredenburg and Nuttall both regard this genus as confined to the Oligocene and Miocene of Indian beds.

[2] Nuttall, W. L. F., *Ann. Mag. Nat. Hist.*, 1926, **17**, 330–37.

[3] Douville, H., *Mem. Geol. Soc. Fr.*, 1925, **Mem. 2**, 84.

A Note on the Occurrence of a Chlorophyll Deficiency in Linseed (*Linum usitatissimum* L.)

A CHLOROPHYLL deficient plant was observed in the Botanical Section at Pusa in a field of the linseed variety, Pusa Type 12 (Howard and Khan),[1] in 1933–34. This plant was quite distinct from the surrounding plants, the terminal portions of all its branches being yellow and the lower parts containing only a small amount of chlorophyll making these portions look greenish yellow (Fig. 1). As in



Left: Normal green plant of Type 12.
Right: Mutant plants.

Type 12, the flowers were pale blue and did not open fully. The plant was stunted and produced very few seeds. In the following year it bred true for the chlorophyll deficient character. The cotyledonary leaves of the seedlings were normal green, but the chlorophyll deficiency was visible from the first pair of true leaves, the growing points of the seedlings showing the characteristic yellow colour. The original plant

appears to have arisen as a mutant from Type 12.

In F_3, fifteen cultures were grown in 1937–38. They behaved as follows:—

Cultures	2	3	6	7 A	8A	18 B	26 B	28	29
Heterozygous—									
Green	46	35	19	17	15	23	15	29	25
Chlorophyll deficient ..	8	9	8	5	5	6	5	4	4
TOTAL ..	54	44	27	22	20	29	20	33	29
X^2 (3 : 1)	3·19	0·48	0·31	0·05	0·00	0·29	0·00	2·92	1·95

Cultures	11	13 A	17	24	25	30
Homozygous—						
Green	46	37	48	..	..	..
Chlorophyll deficient ..	..	..	..	12	18	22

Chlorophyll deficiency in *Linum* has been reported by Fischbach.[2] He observed variegated plants in the F_1 of *Linum hirsutum* × *L. viscosum,* although both the parents were normal green.

The new mutant type was crossed with Type 12 (T. 12 ♀ × Mutant ♂) in 1934–35 and in 1935–36 the F_1 was grown. The F_1 plants were normal green like the Type 12 parent and could not be distinguished from it except by their hybrid vigour, being more vigorous in growth and slightly earlier in maturity than either parent. The green condition, therefore, is completely dominant to the chlorophyll deficient condition.

The F_2 progeny was grown in 1936–37 and the results given below were obtained:—

	Green	Chlorophyll deficient	Total
Observed	368	100	468
Expected on 3 : 1 basis	351	117	468

$X^2 = 3·29$ and P is between 0·1 and 0·05; the fit is fair.

In all the above segregating cultures there is agreement between the observed and the expected frequencies and the ratio of homozygous to heterozygous cultures in F_3 also approximates to expectation. The results, therefore, clearly indicate a single factor difference between the normal and the chlorophyll deficient conditions.

It may, however, be pointed out that in F_2 and in the majority of F_3 cultures there is a deficiency in the chlorophyll deficient class. This may be due to the death of some of the chlorophyll deficient plants, which, being very weak, could not grow as well as the normal plants. Dead plants which seemed to belong to this class were actually observed while taking the counts, but were not taken into consideration.

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April 3, 1939.

[1] Howard, G. L. C., and Khan, A. R., *Mem. Dept. Agric. India* (Bot. Ser.), 1924, **12**, 1.

[2] Fischbach, C., *Z. indukt. Abstamm. U. Vererb. Lehre*, 1933, **65**, 180.