Many types of chlorophyll deficiencies occur in Sorghum. At Coimbatore, simple monogenic segregations have been obtained between normal chlorophyll, and the following deficiencies, (1) Lethal White, (2) Lethal Virescent White, (3) Lethal Pale, (4) Lingering Lethal Pale, and (5) Surviving Pale (Ayyangar and Ayyar, 1932). In the Year Book of the Department of Agriculture, United States of America for 1936, in the chapter on Sorghum Improvement, John H. Martin reporting "the results reported to or obtained by the writer in addition to those found in the literature," records monogenic segregations between normal chlorophyll and (1) White, (2) Virescent and (3) Yellow. The yellows reported by the American workers are of two categories $Y_1Y_1$ to $Y_4Y_4$ (inclusive) by Karper and Conner (1930) and $Y_5Y_5$ and $Y_6Y_6$ by Quinby and Karper (1934). The literature pertaining to $Y_1Y_1$ and $Y_2Y_2$ (Karper and Conner, 1931) was available to the authors of this article. The other references are not available and it is possible that they are of experiences "reported to or obtained by" Mr. Martin (1936). In this article two fresh experiences in continuation of those already reported from Coimbatore are recorded.

**Xantha.**

Xantha seedlings were first met with in July 1936 in the progeny of a single head of *Sorghum coracaeum* Snowden from North Rhodesia. The seedling counts gave, green 1,210 and xantha 386. The xantha seedlings could be distinguished by the yellow colour of the seedling leaves, the yellow tint being in the neighbourhood of citron yellow (Ridgway, 1912). They could be spotted five days after sowing. The yellow seedlings begin to die off from the sixth day onwards, the maximum death being between the eighth and tenth days. In rare cases under favourable conditions, xantha seedlings linger to live on to a maximum of two weeks. Twenty-five per cent. of the xantha seedlings had green stripings of sorts on one or both of the first leaf-blades. The leaf-sheaths were free from such striping. The
striping is longitudinal and may vary in width from 0.2 mm. to 3·0 mm. When so striped these seedlings could live a bit longer but never beyond a fortnight.

Twenty-five selections were carried forward from the F₂ and of these 15 segregated once again giving the total figures, green 6,401, xantha 2,015. Thirteen out of the 15 segregates threw xantha seedlings with green stripes. The percentage of striped seedlings varied from 19 to 49 with an average of 34·5.

Estimations of chlorophyll and xanthophyll were made by methods similar to those adopted by Demerec (1925) on maize seedlings. The average of six determinations shows that the xantha seedlings had a chlorophyll content of 9·7 per cent. and a xanthophyll content of 97·8 per cent. in comparison with green seedlings. The height of the green seedlings (average of 100, eight days old) was 14 cm. and of xantha 9 cm. The root length of these seedlings was 13·5 cm. in the greens and 8·6 cm. in the xanthas. Hundred seedlings of the green group gave an average weight (four determinations) of 22·7 gm. those of a similar number in the xantha group weighing 12·1 gm.

The gene producing this xantha seedling (which is a simple monogenic recessive to green seedling) has been designated yₓ, a symbol in the y₁ series already in use by Karper and others.

**Patchy Albino.**

The occurrence of lethal albinos that are absolutely white is common in cereals. In sorghum a new experience in which albino seedlings are albinotic in patches has been met with. The whole leaf does not turn white. The leaf remains green but develops erratic patches of chlorophyll-deficient areas on either side of the midrib (vide illustration.) These patches tend to be elliptic. They often coalesce across the midrib and give the leaf-blade the appearance of being banded. They are absolutely distinct from being "zebra". The patches are more mosaic in general outline than definitely delimited like the zebra striping. Patchy albinos can be spotted in seedlings 5 to 6 days old. The seedlings start by being green and develop the patches later on. The chlorophyll in these patches fades to a pale green at first and then to yellow and on to white. This deficiency is manifested in the seedling leaf-sheaths also in a faint manner. These patchy albino seedlings are poor in growth and begin to die from a fortnight to about 20 days after germination. The patchiness being variable some seedlings that are sparsely patchy manage to live a little longer. In the shade and under care with nutrient solutions, a few seedlings could be kept alive for a maximum
Green

Patchy Albino

Sorghum Seedlings.
period of two months. The growth at the end of this period is miserable and death is inevitable.

The height of a seedling (average of 100) twelve days old, was 17·3 cm. in the green and 12·8 cm. in the patchy albino. The roots of the green seedling had a length of 15·3 cm. and of the albino 7·6 cm. The average weight of 100 seedlings (four determinations) was 19·1 gm. in the greens and only 6·5 gm. in the patchy albinos.

Segregations for this character have been met with in one South Indian variety belonging to the group of *Sorghum Roxburghii* Stapf. var. *hians* Stapf. and in one race belonging to the group *Sorghum elegans* (Koren) Snowden from the Tanganyika Province of South Africa.

In the South Indian variety the F₂ segregation gave green seedlings 758, patchy albinos 247. Selections from 25 green plants were carried forward and a third generation raised. Of these 25, sixteen segregated once again giving a total F₃ population of 5,630 greens and 1,822 patchy albinos. In the African race the F₂ segregation gave 110 green seedlings and 34 patchy albinos. Four selections were carried forward to an F₃ and of these three segregated giving the following total figures, greens 718, patchy albinos 230. It is noteworthy that this new type of chlorophyll deficiency has been experienced both in an Indian and in an African race of sorghum. The gene responsible for the production of patchy albino has been designated *alₚ*, *Alₚ* results in normal green seedlings.

**Summary.**

Two new types of chlorophyll deficiencies, *viz.*, xantha and patchy albinos, have been met with in sorghum. Both are lethal. Xantha seedlings are yellow in colour and are deficient in green chlorophyll pigment only. A gene designated *yₓ* is responsible for xantha seedlings. *Yₓ* results in the normal green seedlings. Patchy albinos differ from complete albinos in being greenish in colour with patches of albinotic areas. The gene responsible for the production of these patchy albinos has been designated *alₚ*, *Alₚ* results in normal green seedlings.

**REFERENCES.**