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Short communication

Inheritance of fruit-coat colours in *Trichosanthes anguina* Linn.

A. K. Sardar and K. K. Mukherjee

Cytogenetics Laboratory, Department of Botany, Bose Institute, 93/1, Acharya Prafulla Chandra Road, Calcutta-700 009, India

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Summary. In *Trichosanthes anguina* Linn. (Cucurbitaceae), reciprocal crosses among three naturally occurring fruit-coat colour varieties (deep green, green and white) and two yellow fruit-coat colour mutants isolated in the M_1 generation showed that a multiple allelic series control the fruit-coat colours. In the F_2 generation the fruit-coat colours segregated in a monohybrid ratio with deep green dominant over green, yellow and white, green dominant over yellow and white, and yellow dominant over white. Two yellow fruit-coat colour mutants used in this study were isolated from X-ray- and EMS-treated populations of a white fruit-coat colour variety.

Key words: Multiple allelic series – Dominance relationships – Induced mutants

Introduction

Trichosanthes anguina Linn. is a common annual creeper cultivated in various parts of India during the summer season. The fruits of this plant are used as a vegetable. Cultivars of this species have either deep green, green or white fruit and this investigation was undertaken to study the inheritance of these fruit-coat colours.

Materials and methods

Three naturally occurring fruit-coat colour varieties of *T. anguina* namely, deep green with white stripes (Fig. 1), green with white stripes (Fig. 2), white with white stripes (Fig. 3) and two yellow fruit-coat colour mutants (Fig. 4) with yellow stripes formed the materials for this study. In all the naturally occurring varieties, white stripes running lengthwise from top to bottom on the fruit-coat along with respective background colours, were observed. In the yellow mutant the stripes were yellow instead of white. Since white stripes are a constant feature of the naturally occurring varieties and yellow stripes of the induced mutants, henceforth for sake of convenience, only the background fruit-coat colours will be mentioned.

Figs. 1–4. Different fruit-coat colour varieties of *T. anguina*. **1** Deep green; **2** Green; **3** White; **4** Yellow

Table 1. Segregation of fruit-coat colour in the F_2 and backcross generations of *Trichosanthes anguina* L.

Crosses and backcrosses	No. plants with fruit-coat colour				Total	χ^2 (3:1) or (1:1)	*P*
	White	Yellow	Green	Deep green			
Green × Deep green	–	–	23	70	93	0.0036	0.98–0.95
Deep green × Green	–	–	21	65	86	0.0156	0.95–0.90
White × Green	21	–	60	–	81	0.0370	0.90–0.80
Green × White	18	–	52	–	70	0.0190	0.90–0.80
Yellow × Green	–	27	77	–	104	0.0513	0.90–0.80
Green × Yellow	–	24	67	–	91	0.0915	0.80–0.70
White × Yellow	17	52	–	–	67	0.0048	0.95–0.90
Yellow × White	26	81	–	–	107	0.0280	0.90–0.80
(White × green) × White	44	–	41	–	85	0.1268	0.80–0.70
(Green × yellow) × Yellow	–	37	34	–	71	0.1268	0.80–0.70
(White × yellow) × White	52	50	–	–	102	0.0392	0.90–0.80

Reciprocal crosses between deep green and green, green and white, yellow and green and white and yellow fruited varieties were made after emasculation. The parents and F_1 hybrids were grown in the experimental garden of the Bose Institute at Shyamnagar. Three backcrosses were made as shown in Table 1. F_2 and back cross populations were grown to maturity and scored for fruit-coat colour. Only one of the two yellow mutants was used in the study.

Results and discussion

In reciprocal crosses, deep green × green, green × yellow, green × white and yellow × white, the fruit-coat colours of the F_1 plants were deep green, green, green and yellow, respectively. In the F_2 generation the fruit-coat colour for each of the crosses segregated in a monohybrid ratio (Table 1). It is evident from the reciprocal cross data that deep green is dominant over green, green is dominant over yellow and yellow is dominant over white. The segregation pattern of the F_2 generations and backcrosses (Table 1) indicated that differences in seed coat colour are governed by multiple allelic series at the same locus.

The yellow fruit-coat colour mutant recovered from the M_1 generation of the white population showed dominance over the mother line and is therefore a reverse mutation from white. Similar back mutations from the white recessive type toward the dominant yellow type, as observed in *T. anguina,* have also been reported earlier in a MB[1] mutant of barley (Volodin and Lisovskaya 1977) and in the ligule-less (*li*) locus in barley (Konishi 1980). The gene symbol G^DG^D for deep green, GG for green, g^yg^y for yellow and gg for white is proposed for the fruit-coat colours of *T. anguina.* The dominance relationships are: $G^D > G > g^y > g$.

References

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