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RADIATION INDUCED AMBER-GRAINED MUTANTS IN VARIETY TONARI 71 OF WHEAT

THE value of induced mutagenesis in plant breeding has been a point of debate for a considerable time and the opinions have differed from euphoria at one extreme to complete pessimism on the other. It has, however, now come to be accepted that for rectification of simply inherited shortcomings of varieties otherwise agronomically very superior, mutation breeding is a very useful adjunct to the conventional plant breeding procedures. In this communication we report mutations for grain colour induced by gamma-ray treatment in the variety Tonari 71. Tonari 71 was released from the CIMMYT programme in Mexico in 1971 and has the advantage of high yield, high protein content (14·9%) high sedimentation value (45·2 cc) and a high degree of field resistance against all the three rusts. In the special varieties category of the All India Coordinated Wheat Trials, Tonari 71 recorded the highest yield in the year 1972-73 and was characterized by a very wide adaptability. This variety however, has the handicap of possessing red coloured seed which lowers its consumer acceptability.

Dry seeds of Tonari 71 were treated with 30 KRad of Co^{60} gamma-ray in one experiment. In another experiment, seeds presoaked for 17 hours in water were treated with 0·02% nitroso methyl urea (NMU) for six hours at 25°C. The seeds were sown in the fields for raising M_1 plants. The M_1 plants were selfed to eliminate any outcrossing and thrashed individually with care to prevent any mechanical mixture. Large M_2 populatiohs were grown for both the treatments and rigorous screening was exercised for plants with amber coloured grains. The NMU treatment did not yield desired results but one plant with amber grains was identified among the M_2 population from the gamma-ray treatment. This plant was identical with the parent variety with the exception that it has colourless auricles and waxy earheads and leaves instead of pink auricles and non-waxy head and leaves. The mutant had also a tendency to be late in maturity by about six days. Progenies of the 29 selected mutant plants bred true for amber grain in the M_3 and subsequent generations. Seeds from single plant progenies of these 29 plants were bulked in M_4 to compare the yield performance of the mutant with the parental variety. Data were also recorded on yield contributing attributes such as average productive tillers per plant, the average number of grains per earhead and thousand kernel weight. This information is smmarised in Table I. It is observed that

TABLE I

Data on yield and some yield contributing attributes on selected amber grain mutants of Tonari 71

Mutant line	Grain yield (kg) three 15′ rows	Number of productive tillers/ plant (Av. of 5 plants)	Number of grains per panicle (Av. of 5 plants)	Weight of 1000 kernels (gm)
Tanori 71 Control	1·35	9·0	73·55	38·5
TM–1–2	1·50	16·4	59·6	42·0
–4	1·50	17·0	65·2	43·0
–11	1·50	11·4	64·0	44·0
–14	1·60	11·8	54·0	44·0
–16	1·70*	12·2	55·0	41·0
–20	1·75*	8·2	57·6	42·5
–23	1·55	12·2	60·1	42·0
–24	1·50	15·4	67·0	42·0
–25	1·50	11·0	57·0	43·0
–28	1·70*	10·4	57·2	43·5
–29	1·50	9·2	52·0	42·0
–30	1·50	14·2	60·4	42·0
–36	1·75*	10·2	53·0	43·0
–40	1·50	12·6	61·6	45·0
–44	1·65	12·8	65·0	43·5
–49	1·40	15·2	62·0	44·0
–54	1·50	10·8	71·0	43·0
–73	1·50	9·8	55·2	44·0
–77	1·50	10·0	58·4	43·0
–83	1·60	12·8	62·0	40·0
–84	1·50	13·8	57·0	44·0
–87	1·50	8·7	56·8	44·0
–90	1·80*	8·3	57·0	40·0
–93	1·60	9·2	57·6	43·0
–97	1·55	9·2	62·4	44·0
–100	1·70*	11·2	60·4	45·0
–101	1·60	9·5	53·2	42·0
–102	1·50	12·2	54·6	45·0
–107	1·50	10·4	60·0	42·0
SE_m	0·106	2·366	5·146	1·524
C.D. at 5%	0·306	6·843	14·883	4·422

a degree of inter-culture variability is present for all the attributes studied. This is not surprising when one considers that radiation treatment will randomly affect a number of loci and thus produce genetic heterogeneity in the off-spring. Another point of interest is that the data on selected promising progenies clearly indicate that in the matter of yield the mutants are atleast at par with, or even superior to, the parental variety.

Mutagenically induced amber grain mutants have been reported previously.[1,2] The realisation in mutation experiment of a desired grain colour rectification of Tonari 71 underlines the value of mutation breeding as a tool when applied to well planned experiments with limited objectives.

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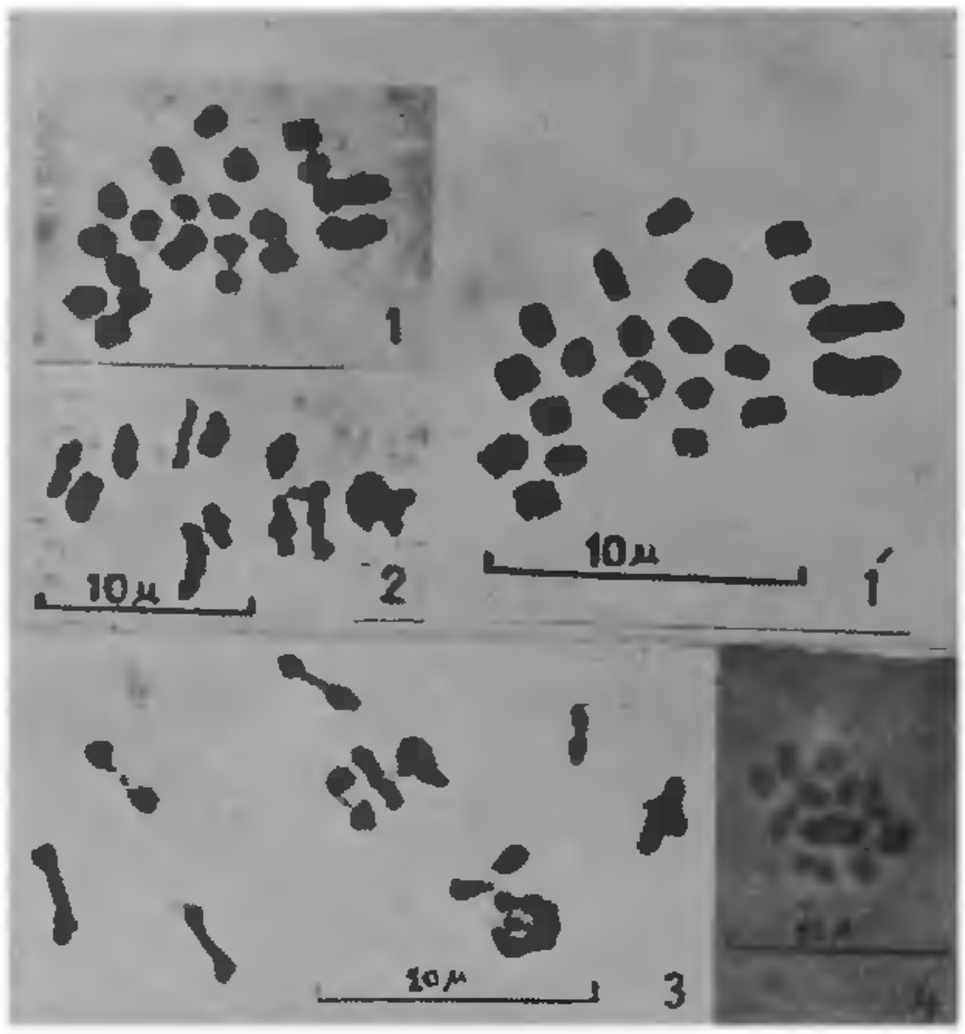
CYTOGENETICS OF COMMELINACEAE: VI. A New Basic Chromosome Number for the Genus *Floscopa*

DIFFERING chromosome numbers have been reported by earlier workers for *Floscopa scandens* Lour. as n or $x = 9$[1], 12[2–4] and 15[5]. We are reporting here the number of $2n = 22$ and $n = 11$, which is new for this species and also for the genus. In a population of plants, two types differing only by poor and vigorous vegetative growth occurred in Taukucha-Rangtia forest and also in Sylhet of Bangladesh. The plants were brought to Dacca and grown at the Dacca University Botanical Garden. Cytological observations were made for three successive years from the same population.

In studying the chromosomes of root tip cells. haematoxylin squash method[6] preceded by pretreatment in saturated paradichlorobenzene for three hours was used. Acetocarmine squash method[7] was used to study meiosis in the pollen mother cells.

The root tip cells from both types showed 22 chromosomes (Figs. 1 and 1'). The chromosomes were heteromorphic with one pair being much larger than the rest. The pollen mother cells of both types contained 11 bivalents (Figs. 2, 3 and 4). The mean chiasma frequency per bivalent estimated from 36 well-spread pollen mother cells. along with standard error ($\bar{X} \pm$ S.E.), was $1{\cdot}95 \pm 0{\cdot}03$. Regular occurrence of 22 chromosomes in root tip cells as well as 11 bivalents in pollen mother cells indicated that the basic number was 11. This record seems to support Brückner's[8] classification of this genus under the tribe *Commelineae* and Brenan's[9] categorization under his "group I" where several members possess $x = 11$ chromosomes.



FIGS. 1–4. Fig. 1. Somatic chromosomes in a root tip cell; Fig. 1', Camera lucida drawing of Fig. 1. Figs. 2, 3 and 4. 11 bivalents in pollen mother cells.

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