induce mutations, seeds of variety 'IGP-76' were irradiated with γ-rays 200 to 1000 Gy. All seeds of M_1 plants were sown separately in individual plant-to progeny rows. The results of screening of M_2 segregating material indicated that γ-ray treatment was effective in induction of male sterility. Frequency of visible mutations were higher in sibbed progeny as compared to open pollinated population and male sterile plants were observed only in sibbed population (1000 Gy). Male sterile plants could easily be identified at the flowering stage by their altered floral morphology (disc florets transformed into ligulate ray florets) and complete absence or presence of a rudimentary anther column. Seeds were collected following sib-mating with the fertile counterparts. Progeny segregated in a ration of 3 normal : 1 male sterile. Further work on the mechanism of sterility, maintenance and linkage relationships with associated characters is under progress. This is the first report of induction of male sterility in niger through the use of physical mutagens. The availability of this mutant will be of great value for exploitation of heterosis on commercial basis.

REFERENCES

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PRODUCTIVE MUTANTS OF NIGER

Seeds of six niger (*Guizotia abyssinica* Cass.) varieties ('GA-10', 'ONS-8', 'IGP-72', 'N-71', 'NB-9' and 'UN-4') were treated with 0.5, 0.75 and 1% ethyl methanesulphonate. After four generations of selection, 29 mutant lines were developed and those were evaluated from 1990-92 during Kharif (July to October) and Rabi (December to March) seasons. Average plant characteristics and yield data of four high yielding mutants along with 'IGP-76' (National Check), GA-10 (Zonal Check) and 'Semiliguda Local' (Local Check) are presented in the Table 1. The high yielding mutants, their parental varieties, mutagenic origin and major characteristic improvement over check varieties are as follows:

ONS-107: (GA-10, 0.75% EMS) - more capitula/plant and seeds/capitulum with high yield

ONS-114: (ONS-8, 1% EMS) - moderately high capitula/plant, high seeds/capitulum and 1000-seed weight and high yield

ONS-125: (NB-g, 1% EMS) - larger capitula with more seeds/capitulum, high 1000-seed weight and high yield

ONS-130: (UN-4, 0.25% EMS) - early flowering and maturity short plant height with more seeds/capitulum, height 1000-seed weight and high yield.

Table 1. Performance of mutant and check varieties of niger during Kharif and Rabi seasons average over 1990-91 and 1991-92

Mutant/ variety/season		Days to maturity	Plant height (cm)	Capitula/plant	Seeds/capitulum	1000-seed weight (g)	Seed yield (q/ha)
ONS-107	K	115	168	25.8	18.4	3.82	5.04
	R	108	78	26.2	19.0	3.85	5.18
ONS-114	K	115	172	22.1	18.8	3.89	4.27
	R	106	81	22.3	19.9	3.98	5.27
ONS-125	K	110	156	18.9	18.8	4.06	3.86
	R	103	80	22.1	20.4	4.23	5.52
ONS-130	K	107	138	20.4	18.2	3.96	4.44
	R	99	71	20.9	19.6	4.18	4.56
IGP-76 (NC)	K	111	163	16.3	17.4	3.63	3.16
	R	103	73	19.6	18.7	3.92	4.46
GA-10 (ZC)	K	118	184	18.4	17.4	3.79	3.53
	R	107	83	20.9	19.9	3.94	4.73
S.Local (LC)	K	120	190	20.2	16.4	3.46	3.56
	R	110	85	21.2	16.6	3.55	3.92
C.D. (5%)	K	5.4	11.4	2.6	2.2	0.26	0.85
	R	4.1	7.2	2.2	1.9	0.22	0.72

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SEED MUTAGENESIS IN *Portulaca grandiflora* (Hook)

Betalain pigments have been used as natural additives. Despite their importance, the biochemistry and genetics of betalain synthesis remain relatively undetermined [1]. *Portulaca grandiflora* represents an ideal material for genetic analysis [2]. In the present work, seed mutagenesis was examined with a view to enhance the chance of detection of new genetic markers in this species.

White ('PgBmj') and red ('PgR') seeds of *Portulaca grandiflora* were treated with ethyl methanesulfonate (EMS) at concentrations ranging from 1.2 to 40% in 0.1 M phosphate buffer (pH 7.0 at 22 ± 2°C) for 4 hours, or with sodium azide (NaN_3) at concentrations ranging from 2.5 to 30 mM in 0.1 M phosphate buffer (pH 3.0 at 22 ± 2°C) for 1 hour. In another set of experiments the presoaked seeds (sterile water, 6, 16, 28 hours at room temperature 22°C) were treated with 1.2% EMS and 2.5 mM NaN_3 for two hours with shaking of the seeds at 30°C. After the mutagen treatments, the seeds were washed to removing the mutagens.

In the M_1 generation, germination and survival percentage of both cultivars decreased. For the selection of mutants, M_2 segregation progenies were raised from seeds of M_1 plants. The frequency of mutated plants was evaluated in the M_2 generation (Table 1).