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INHERITANCE OF MALE STERILITY IN JOB'S TEARS (*COIX LACRYMA-JOBI* L.)

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ABSTRACT

Male sterility (rudimentary male spikes with empty florets) located in the cultivar Romanet of Job's tears (*Coix lacryma-jobi* var. Ma-Yuen (Romanet) Stapf) is inherited as a monogenic recessive trait (gene ms_1).

Key words: Job's tears, *Coix lacryma-jobi*, male sterility, inheritance.

Job's tears, *Coix lacryma-jobi* L., an asiatic relative of maize, cultivated since ancient times in north-eastern hill states of India and used as food, fodder, medicine and ornament, is monoecious. The lower most one or two spikelets in the inflorescence, each enclosed in a modified leaf sheath called involucre, are pistillate and the upper portion with 8-10 male spikelets is staminate. The available information on genetics of the crop is limited to the study of inheritance of a few characters like seedling base colour, style colour, leaf hairiness [1–3], styleless condition [4], solidity of fruit case [5] and plastid phenotypes [6]. The inheritance of male sterility is reported here.

MATERIALS AND METHODS

Two potted plants in the selfed progeny of the cultivated variety of *C. lacryma-jobi*, Ma-Yuen (Romanet) Stapf., (originally obtained from Brazil) had less than 1 cm long male spikes and very small (upper glume about 1 mm long) male spikelets with no trace of development of anthers in the florets. Such spikes withered and dropped in 2-3 days after emergence. In contrast the normal plants had 3-4 cm long male spikes and upper glume of the male spikelet about 0.5 cm long with the spike remaining intact for quite some time even after anthesis. The two plants with diminutive male spikes were therefore considered male sterile. Another strain of *C. lacryma-jobi* growing wild in the University Campus was available (Campus Wild *Coix* var. *typica* Watt). The former had papery thin and soft brownish blue globular fruit cases and the latter had stony hard bluish white ovoid fruit cases. A third strain collected from Anantagiri, found floating in a hill stream at 1000 m

altitude, had hard bluish white ovoid to globose fruit cases (Anantagiri *Coix*, intermediate form between varieties *typica* and *monilifer* Watt). The Campus Wild and Anantagiri strains were crossed with the two sterile male plants of the Brazilian strain by enclosing the male and female plants in one large muslin bag.

RESULTS

The parental and segregating generations were grown under field conditions with proper irrigation in the main crop seasons (June–November) during which the day temperatures ranged from 28 to 34°C and during flowering period from 29 to 32°C.

In cross 1, one Brazilian male sterile plant was crossed with a male fertile plant from the same population. In crosses 2 and 3, the second Brazilian male sterile plant was used, three culms in each case, to cross with male fertile plants from the Campus Wild and Anantagiri strains.

In the three crosses, at least 25 F_1 plants with normal fertility were self pollinated and F_2 generations raised. F_1 plants of the 3 crosses were also back crossed to the original Brazilian male sterile plants maintained through vegetative propagation and segregations studied (Table 1).

Table 1. F_2 and backcross segregations for male sterility in *Coix lacryma-jobi*

Cross : male sterile x male fertile	F_2		P	Backcross		P
	3 : (Ms)	1 (ms)		1 : (Ms)	1 (ms)	
Brazilian Sterile x Brazilian Fertile	166	42	0.2-0.05	49	36	0.20-0.05
Brazilian Sterile x Campus Wild	138	34	0.2-0.05	71	62	0.50-0.20
Brazilian Sterile x Anantagiri	455	179	0.2-0.05	110	118	0.80-0.50
Total	759	255	0.95-0.80	230	216	0.80-0.50

Ms—fertile phenotype, ms—sterile phenotype.

The genetic analysis revealed that male sterility is a monogenic recessive as in majority of the plant species reported earlier [7] and the character remained stable without any tendency of reversion to normalcy in the F_2 and back-cross progenies. Thus, it is a case of spontaneous male sterile mutation, for which gene symbol ms_1 is proposed.

The genotypes of the parents with reference to this character are: Brazilian male sterile ms_1ms_1, Campus wild and Anantagiri Ms_1Ms_1.

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