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A note on the Interspecific Hybridisation in Sesamum

By

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In the course of the cytogenetical studies of the genus *Sesamum* (Gingelly), most of the available wild relatives of the cultivated species viz.—*Sesamum prostratum* Retz, *Sesamum laciniatum* Klein, *Sesamum radiatum* Schum, *and Sesamum occidentale* Heer & Regel., were found possess to very valuable characters like disease and drought resistance. Most of the cultivated varieties of *Sesamum indicum* Linn. (Syn: *Sesamum orientale* Linn.) are found to be susceptible to the attack of *Antigastra catalaunalis* in the early stages and to the virus disease 'Phyllody'. With a view to get an economic type with all the desirable qualities, the species were crossed inter-se and some interesting results have been noted regarding the crossability of the species. The results of the crossability between species obtained from the present and earlier studies are presented in the table below :—

♂ ♀	Sesamum indicum n=13.	S. prostratum n=16.	S. laciniatum n=16.	S. radiatum n=32.	S. occidentale n=32.
Sesamum indicum n=13.	Self.	XX	XX	*	*
Sesamum prostratum n=16.	XX	Self.	XX	*	*
Sesamum laciniatum n=16.	XX	XX	Self.	*	*
Sesamum radiatum n=32.	**	**	**	Self.	XX
Sesamum occidentale n=32.	**	**	**	XX	Self.

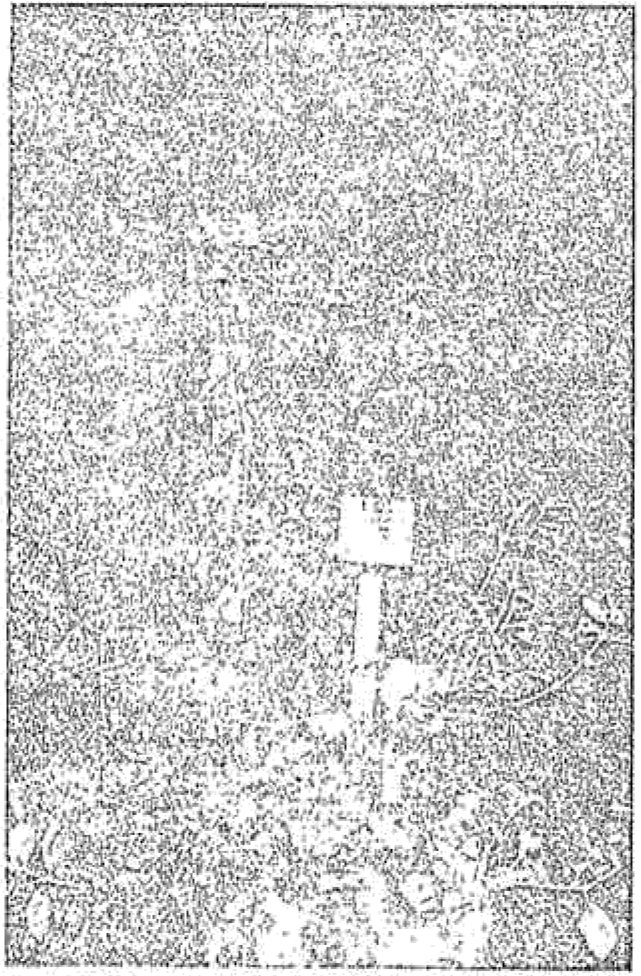
XX — Set fruit and good viable seeds are obtained.

** — Set fruit, both shrivelled and normally developed seeds are obtained.

* — Failed to set fruit.

Out of the twenty crosses only fourteen crosses were done here and the four crosses were previously done at the Division of Botany, Indian Agricultural Research Institute, New Delhi. From the crosses effected here, the results are summarized as follows :—

1



2-a 2-b

3

1. In the crosses *S. prostratum* x *S. laciniatum* and *S. occidentale* x *S. radiatum* and its reciprocal where the chromosome numbers of the parents (n x n = 16 x 16 or 32 x 32) did not differ, high crossability was noticed and the hybrids were fertile.

2. In the crosses *S. indicum* x *S. laciniatum* and *S. indicum* x *S. prostratum* where the chromosome number differs by three (n x n = 13 x 16) a partial setting was obtained and the F_1 plants proved to be practically sterile.

3. In the crosses *S. occidentale* x *S. indicum*., and *S. occidentale* x *S. laciniatum* where the chromosome number of the parents (2n x n = 32 x 13 or 32 x 16) differ widely, setting was observed giving rise to both shrivelled and normally developed seeds which failed in germination.

4. Complete failure resulting in the dropping off of the entire crossed flowers was noticed in crosses *S. indicum* x *S. occidentale*., *S. laciniatum* x *S. occidentale* and *S. laciniatum* x *S. radiatum*., where the lower chromosome number (n x 2 n = 13 x 32 or 16 x 32) plant was used as female.

Ramanujam (1942, 1944) has synthesized *Sesamum indicatum* (2n = 58) an amphidiploid of the hybrid *Sesamum orientale* x *Sesamum prostratum* (2n = 13 + 16) by doubling of the chromosomes of the hybrid. This was found to be fertile with certain desirable qualities like disease resistance, but was found to be low in oil content and not suitable for cultivation. They were backcrossed with *S. orientale* and further work is in progress at I. A. R. I., New Delhi.

Working on similar lines, the hybrid of *S. indicum* x *S. laciniatum* (2n = 13 + 16) obtained at Coimbatore was found to be intermediate in respect of several characters (Fig. 2a) of the parents (Figs 1 & 3) but showed dominance towards pest and disease resistance. The hybrid in spite of profuse flowering proved to be completely sterile and set no fruit. The study of meiosis in pollen mother cells showed 29 chromosomes that is (2n = 13 + 16) the number equal to the sum of the genomes of the parents. At Metaphase I, the chromosomes formed varying numbers of bivalents and univalents and occasionally a trivalent also was noticed. The maximum number of bivalents noticed in any one cell was nine. In most of the cells, the chromosomes were found scattered in the spindle. The Anaphase distribution was found to be irregular, which resulted in the abortion of most of the gametes. Back crossing with the parent proved to be a failure and flowers were shed on the third or fourth day.

In order to get a fertile amphidiploid progeny the vegetative buds of the sterile hybrid were treated with 0·4% aqueous colchicine on three consecutive days in the early mornings. A few shoots from the treated buds were seen showing the symptoms of colchicine effect (Fig 2a).

But only one branch proved to be affected and the pollen grains of this showed a marked change. Most of them were bigger in size and full of contents. These flowers with good pollen are developing capsules. The progeny of the newly produced double diploid or amphidiploid is expected to provide material for further study and the work is in progress at the Cytogenetics section, Agricultural College and Research Institute, Coimbatore.

LITERATURE CITED.

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EXPLANATION OF PLATES.

Fig. 1— *Sesamum indicum* Linn. TMV 1. Female parent. 2=26.
Fig. 2a– F_1 hybrid of *S. indicum* x *S. laciniatum*. 2n =13 x 16.
Fig. 2b– Colchicine treated plant.
Fig. 3— *Sesamum laciniatum* (wild species) male parent. 2n=32.

Herbicides and their Scope in South India

By

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Introduction: Weeds are undesirable plants. Muenscher (35) has defined weeds as plants which grow where they are not wanted or where it is desired that something else should grow. In short, they are plants out of place. Weeds compete with crops for light, moisture, plant food and space. They seed profusely and thrive even under adverse conditions, unlike crop plants. The seriousness of weed competition has been recognised ever since man began the cultivation of crops; but despite rapid advancement of science, weed control still remains a problem.

The annual loss due to weeds alone in the United States of America is estimated § to be over 300 million dollors, greater than the losses sustained by the farmer due to livestock diseases, insect pests and plant diseases.

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