

## A REPORT ON *ASPHONDYLIA SESAMI* FELT. INDUCED OVARIAN GALL IN SESAME (*SESAMUM INDICUM* L.) FROM WEST BENGAL PLAINS

SONALI SENGUPTA\*, ANIMESH K. DATTA\* and SAMIRAN CHAKRABARTI\*\*

\*Department of Botany, Breeding and Cytogenetics Lab., Kalyani University, Kalyani - 741235, India.

\*\* Department of Zoology, Biosystematics Research Unit, Kalyani University, Kalyani - 741235, India.

Ovarian gall induced by *Asphondylia sesami* (order: Diptera, family: Itonididae) have been reported from the natural and mutagenized population (M<sub>2</sub>) of *Sesamum indicum* L. var B-67 (family: Pedaliaceae) for the first time from the plains of West Bengal during kharif season. Infection was noted in 99.23% (5437 plants scored) plants in the population and the infected ovaries were irregularly subglobose, lobed, solid as compared to oval to oblong ovaries in normal flowers. Anthers of the gall forming flowers were short and sagitate in nature. Estimated average loss of seed yield due to gall formation has been calculated as 31.28% (4.47% to 85.71%).

**Keywords:** *Asphondylia sesami* Felt.; Kharif season; Ovarian gall; *Sesamum indicum* L.; West Bengal plains

Different species of *Asphondylia* (order - Diptera; Itonididae) have been reported to form galls in root, stem, leaf and flower of different plant species<sup>1</sup>. *A. sesami* Felt. induces flower gall in *Sesamum indicum*<sup>2-5</sup>, an annual herb of the family Pedaliaceae and a much valued crop in industry as seeds contain 45-50% edible oil (85% unsaturated fatty acids) and 20-25% protein<sup>6</sup>. Distribution of *A. sesami* has been reported to be strictly restricted to South India and Uganda<sup>1</sup>. In this investigation ovarian gall induced by *A. sesami* has been described from the natural and mutagenized population (M<sub>2</sub> generation) of *Sesamum indicum* L. var. B - 67 from the plains of West Bengal (Nadia District - Kalyani) during Kharif season, while performing experiments on induced mutagenesis to improve seed yield in sesame.

From the survey of 5437 plants, gall formation was noted among 99.23% plants. Detection of galls among plants was noted between second week of June (mid-flowering stage) and first week of August (harvesting stage). Mature fly of *S. sesami* was obtained within 7 - 10 days after bagging (insect net with fine mesh) of the affected inflorescences. The gall midges were often parasitized by *Habrobracon* Sp. and *Tetubracon* Sp. (order - Hymenoptera; family: Braconidae). The affected ovaries were irregularly subglobose, lobed solid as compared to oval

to oblong ovaries in normal flowers (Fig. 1A, B). On histological examination of gall forming ovaries it was noted that the ovarian chambers were irregular with rudimentary or no ovule but unaffected ovaries were two chambered (ovary transformed into apparently four chambered including one ovule to each due to intruded mass of tissue from the dorsal phase of carpellary wall) with two rows of ovules in each chamber (Fig. 2 and 3). Single pupa was found to be associated with each affected ovary (Fig. 2). Anthers (Fig. 4A) of the gall forming flowers were shorter ( $2.7\text{mm} \pm 0.23$ ) and sagitate in shape as against unaffected flowers (Fig 4B anther size -  $3.86\text{mm} \pm 0.11$ ; shape - oblong). Fertility (diseased: 38.06% to 45.74% mean 40.26%; normal : 79.5% to 88.6% mean 84.3%) and size (diseased:  $55.6\mu \pm 0.3 \times 51.9\mu \pm 0.3$ ; normal :  $62.6\mu \pm 0.37 \times 58.6\mu \pm 0.39$ ) of the pollen grains decreased in diseased plants than normals (10 randomly selected plants were assessed from each class). Fruit set has been totally inhibited in gall forming flowers.

Estimated average loss of seed yield over the population due to disease was 31.28%; although, loss in seed yield varied from plant to plant (4.47% - 85.71%). Plants attaining height of 70.0 cm to 130.0 cm demonstrated maximum loss in seed yield (33.88%); while, loss in seed yield due to



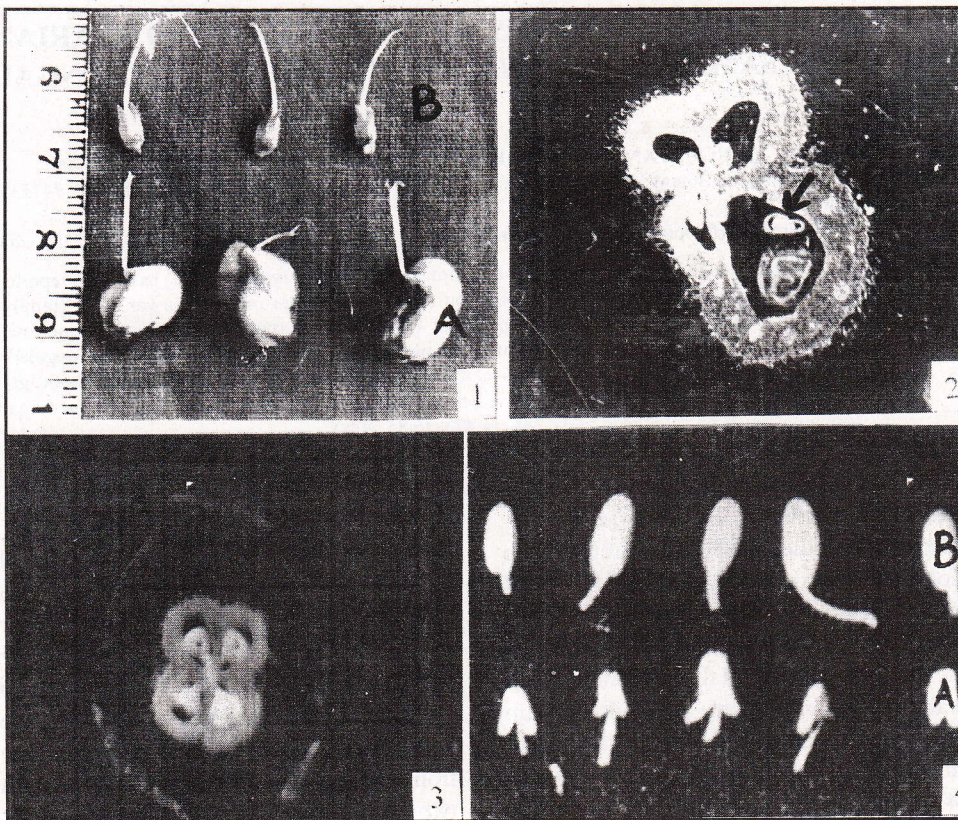


Fig. 1. Affected ovaries showing gall (A) and normal ovary (B).

Fig. 2. Histological section (15 $\mu$ ) through ovarian gall. ( $\rightarrow$ Pupa).

Fig. 3. Histological section (15 $\mu$ ) through normal ovary.

Fig. 4. Sagitate (A. affected) (B, normal) anthers.

disease was relatively less in taller (130.0 cm to 190.0 cm - 25.54% loss) and shorter (10.0 cm to 70.0 cm - 16.94% loss) plants.

Twenty nine *early flowering* (first flowering 10 - 15 days earlier, complete flowering by 23rd to 27th May - 42 to 46 days from sowing) and 13 *dwarf* (18.1 - 34.2cm height; mean - 25.36 cm  $\pm$  1.52) mutants screened in the  $M_1$  population were found to be totally unaffected. The mutants have possibly escaped disease or shown field resistance to *A. sesami*, which however needs further investigation to substantiate.

The authors are grateful to Council

of Scientific and Industrial Research for financial assistance.

#### References

1. Mani M S 2000, *Plant galls of India*. Oxford and IBH publishing Co.
2. Sundar Raman A H 1924, *J. Indian Bot. Soc.* 4 41
3. Mani M S 1934, *Rec. Indian Mus.* 34 410
4. Mani M S 1948, *J. R. Asiatic Soc. Bengal (Sci.)* 14 148
5. Mani M S 1959, *Cecidotheca Indica. Agra Univ. J. Res. (Sci)* 8 220
6. Maity S, Hegde M R and Chattopadhyay S B 1988, *Hand book of annual oil seed crops*. Oxford and IBH publishing Co.