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DIFFERENTIAL BEHAVIOUR OF POLLEN OF B CHROMOSOME CARRIER AND NON CARRIER PLANTS OF *IMPATIENS BALSAMINA* IN AMONIUM NITRATE

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The genetic activity of B chromosomes is a controversial issue for workers since long. Earlier B chromosomes were thought to be inert having no genetic activity. However, recent researches have thrown some light on their genetic activity. To determine the genetic activity of B chromosome, we have started a set of experiments involving the response of pollen germination of carrier and non-carrier plants of *Impatiens blasamina* to a wide range of chemicals. In the present experiment the pollen from carrier and non-carrier plants were used for testing their response to different concentrations of amonium nitrate. Differences were obtained in behaviour of carrier and non-carrier plants.

Key words : Differential Behavior, Pollen *Impatiens balsamina*.

B chromosomes are present in over a thousand species of plants and animals. Earlier workers termed them optional extras and believed that they were inert, having no gentic activity. However, recent investigations demonstrating their exophenotypic and endophenotypic effects (Jones and Rees 1967) in Rye and Pant and Raghuvanshi (1982) reported that chaisma frequency of A chromosome is influenced by presence of B chromosome. However reports on exophenotypic effects are still few. Change in colour of achenes in *Haplopappus gracilis* from purple to red was reported by Jackson and Newmark (1960).

Pollen germination is a very sensitive biological phenomenon and is directly under genetic control. The structure of pollen, nature of storage material and germination behiviour varied from species to species and is characteristic for every plant species.

Earlier it was reported that B chromosome influenced pollen germination and pollen tube growth. Roman (1948) reported greater pollen tube growth in B carrier plants of maize. The pollen of non carrier plants showed higher germination in *Plantago coronopus* (Kumar, 1984), while reverse was found in *Trigonella foenum-graceum* (Pant, 1981).

In the present experiment we have compared the effect of NH_4NO_3 on pollen of carrier and non-carrier plants of *Impatiens balsamina* to establish the genetic activity of B chromosomes.

MATERIALS AND METHODS

In *Impatiens balsamina*, two types of plants one having two B chromosome and other lacking them were taken for the study. The pollen taken from open flower in which anthesis had just occurred, were germinated in non-corrosive cavity slides by "Hanging drop" technique. The culture media comparised 2% sucrose as basal medium, which was supplemented with 10 ppm, 50 ppm, 100 ppm, 500 ppm, 1000 ppm, and 2500 ppm NH_4NO_3 solutions. After dusting the pollen germinated at 24±2°C in the incubator and were fixed after 15, 45 and 75 minutes, by adding 1:3 acetic alcohol. Then one drop of glycerine was added to prevent the medium from dryness.

Preliminary experiments indicated that 2% sucrose and anthesis at 9 a.m. were suitable conditions for pollen germination. Thus obtained data was subjected to statistical analysis and A.M and S.E values for germination percentage was calculated.

OBSERVATIONS

It was clear from the Table 1 that pollen from non-carrier plant gave higher germination percentage than that of non-carrier. After 15 minutes of sowing pollen from carrier plant germinated only in 2% sucrose. No germination was found in NH_4NO_3 sucrose solution, while non carriers germinated up to 50 ppm solution. After 45 minutes of dusting, pollen from carriers and non-carriers both germinated up to 100 ppm solution of NH_4NO_3. Same was found after 75 minutes of sowing, non-carrier gave maximum germination (100%) in 2% sucrose and 2% sucrose + 10 ppm NH_4NO_3. solution.

DISCUSSION

In the present experiment the difference in the germination percentage of carrier and non-carrier

Table 1 : A.M. + S.E. values of germination Percentage of carrier and non-carrier pollen of *Impatiens balsamina*.

Duration	Source of variation	Socrose	Concentrations of NH_4NO_3 (ppm) in 2% sucrose solution 10ppm	50ppm	100ppm	500ppm	1000ppm	2500ppm
15 min	Carrier	13.33±2.84	0	0	0	0	0	0
	Non-carrier	25.33±4.38	76.001±2.55	28.17±3.88	0	0	0	0
45 min	Carrier	85.75±3.98	72.50±4.38	79.00±2.89	76.80±2.49	0	0	0
	Non-carrier	88.11±5.67	86.37±5.21	93.78±1.05	87.63±3.63	0	0	0
75 min	Carrier	95.67±2.29	95.55±0.44	79.55±3.80	81.67±1.99	26.12±9.05	0	0
	Non-carrier	100	100	82.67±1.90	83.67±1.22	26.00±10.34	0	0

pollen will help in understanding the activity of B chromosome with respect to pollen germination and its allied physiological activities. Pollen grain is a very sensitive system, it shows its affinity to different ions variously (Gupta and Murty 1985). Sensitivity of pollen grain to specific ion depends upon its absorption rate and ability of cytoplasm to tolerate the particular concentration. In the present experiment, after 15 miuntes of dusting the carrier pollen showed no germination with NH_4NO_3 solution, while non-carrier gave considerable higher values. So, in the initial stage of germination NH_4NO_3 supressed the germination ability of carrier pollen. It seems that cytoplasm of carrier pollen are not to tolerate the ion stress of NH_4NO_3. This ion stress may have formed the inhibitory complex against the germination initiating enzymes. However, in non-carriers, cytoplasm of pollen tolerated higher concertrations of NH_4NO_3, by formation of a counteracting system against inhibitory complex and gave regular germination. After 45 and 75 minutes of dusting the carriers also gave regular germination as found in non-carriers. So, it is apparent that the counteracting system must be in operation in carriers, but it becomes active in later stages of germination. So, it may be interpreted that in later stages of germination in carriers, due to some enzymatic action physiological state of pollen was changed and the cytoplasm tolerated higher concentration of NH_4NO_3. The results obtained from this experiment lead to the conclusion, that the NH_4NO_3 affected pollen germination in carriers and non-carriers in different ways by probably changing their enzymatic behaviour. Enzyme action is directly under control of the genome of the plant. So, the differential behaviour of pollen, to NH_4NO_3 is attributed to the differences in the genetic constitution of two type of plants one having 2B chromosomes and other not possessing them.

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