

Whether optimum pollen germination and tube length attained in the same growth medium (Sucrose + Sodium arsenite) and further evidence of a criticism of the hypothesis of Nair, Nambudiri and Thomas (1973) - A Critical Review

S. A.SALGARE

Salgare Research Foundation Pvt. Ltd., Prathamesh Society, Shivaji Chowk, Karjat - 410 201 (MS), India

E-mail : drsalgare@rediffmail.com & drsalgare@sancharnet.in

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SUMMARY

The widest range of concentrations of sodium arsenite was proved to be 10^{-17} - 10^{-5} mg/ml which stimulated the germination of pollen, while 10^{-17} - 20 mg/ml stimulated the tube growth of Apocynaceae. Sodium arsenite produced as high as 387.50% stimulation in pollen germination of successive flowers of Apocynaceae. However, 138.75% stimulation proved to be the highest produced by the herbicide in the pollen tube growth of successive flowers of Apocynaceae. Optimum percentage of pollen germination and tube length were attained in different concentrations of the herbicide.

Key word : Palynology, Environmental Sciences, Toxicology.

In spite of the very varied approach of study and the extensive work done, the larger number of herbicides being developed in industry and used in agriculture stand only in testimony of the necessity of more work in the field.

Pollen of successive flowers (*viz.* F, F-24, F-48, F-72 series *i.e.* open flowers and the flower buds which require 24, 48, 72 hours to open respectively) of 5 cultivars of Apocynaceae *e.g.* red-, pink- and white-flowered cultivars of *Nerium odorum* Soland. and pink- and white-flowered cultivars of *Catharanthus roseus* (L.) G. Don. were collected at the stage of the dehiscence of anthers in the open flowers. Germination of pollen grains of successive flowers was studied by standing-drop technique in the optimum concentrations of sucrose as well as in the optimum concentrations of sucrose supplemented with the wide range of concentrations (10^{-17} - 10^{-2} - 10^{-3} , 1, 5, 10, 20-20-100 mg/ml) of sodium arsenite. Observations on the germination of pollen and tube growth were recorded 24 hours after incubation.

Potentiality of pollen germinability was noted in F series of all the 5 cultivars of Apocynaceae studied. Pollen of F-24 series of red-flowered cultivar of *Nerium odorum* and both the cultivars of *Catharanthus roseus* were found germinated in the optimum concentrations of sucrose. Pollen of F-48 and F-72 series of pink-flowered cultivar of *C. roseus* showed their germination in the optimum

concentrations of sucrose. Thus the potentiality of pollen germinability in Apocynaceae was noted 10 out of 20 series investigated (Table 1).

All the different concentrations (10^{-17} - 10^{-2} - 10^{-3} , 1, 5, 10, 20-20-100 mg/ml) of sodium arsenite tried found to be toxic for the germination of pollen of F-24 series of red-flowered cultivar of *N. odorum* and F-48 and F-72 series of pink-flowered cultivar of *C. roseus* as a result of which the failure of the germination of pollen was resulted (Table 1). This proves that the pollen of the said series are highly sensitive and acts as an ideal indicator of pollution.

The widest range of concentrations of the herbicide was proved to be 10^{-17} - 10^{-5} mg/ml which stimulated the germination of pollen of Apocynaceae. However, 10^{-17} - 20 mg/ml sodium arsenite proved to be the widest range of concentrations which stimulated the tube growth of Apocynaceae It was the pollen of F-24 series of white-flowered cultivar of *C. roseus* which showed the stimulation in the pollen germination and tube growth of the widest range of concentration of the herbicide (Table 1). Sodium arsenite produced as high as 112.50% stimulation in pollen germination of successive flowers of Apocynaceae. However, 400.00% stimulation proved to be the highest produced by the herbicide in the pollen tube growth of successive flowers of Apocynaceae (Table 1).

It should be pointed out that horticulturists and plant breeders often failed to get the fertile seeds in spite of all the care taken during artificial pollination. Unless sterility is the main cause, failure of seed setting may be due to slow growth of the pollen tube or its early degeneration in the style. As a rule, the length of the pollen tube obtained

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