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A Review:

Monitoring of herbicide (sodium arsenite) toxicity by using pollen as indicators – pollen of brinjal: further evidence of a criticism of Banerji and Gangulee (1937), Dharurkar (1971 - Ph.D. Thesis), Berg (1973), Brandt (1974), Vick and Bevan (1976), Rasmussan (1977), Navara, Horvath and Kaleta (1978), Mhatre (1980-Ph.D. Thesis), Mhatre, Chaphekar, Ramani Rao, Patil and Haldar (1980), Shetye (1982-Ph.D. Thesis) and Giridhar (1984-Ph.D. Thesis)

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ABSTRACT

All the concentrations (10^{-17}-10^{-2}-10^{-3}, 1, 5, 10, 20-20-100 mg/ml) of sodium arsenite tried suppressed the germination of pollen of F-24 series of all the cultivars of brinjal investigated. The widest range of concentrations of sodium arsenite proved to be 10^{-17}-5 and 10^{-17}-0.1 mg/ml which inhibited the germination of pollen and tube growth of brinjal, respectively. Sub-toxic concentration of sodium arsenite caused as high as 96.83 and 86.67% inhibition in the germination of pollen and tube growth of brinjal, respectively.

Key words : Palynology, Physiology of Pollen, Herbicides.

Inspite 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.

MATERIALS AND METHODS

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 brinjal *i.e.* brinjal katery, brinjal long, brinjal muktakeshi, brinjal round and brinjal small were collected soon after the dehiscence of anthers in the open flowers. Germination of pollen grains was studied by standing-drop technique in the optimum concentrations of sucrose which acts as control 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. Pollen grains were incubated soon after the dehiscence of anthers. The cultures then transferred to a moist filter chamber, stored at room temperature (30.3-32.7C) having RH 66% and in diffuse laboratory light. The experiments were run in triplicate and average results were recorded. Observations on the germination of pollen and tube growth were recorded 24 hours after incubation. For each experiment a random count of 200 grains was made to determine the percentage of pollen germination. For measurement of length of pollen tubes, 50 tubes were selected randomly and measured at a magnification of 100x.

RESULTS AND DISCUSSION

Present investigation proved that the percentage of pollen germination is less than the pollen viability. However, Banerji and Gangulee (1937) and Dharurkar (1971-Ph.D. Thesis) reported higher percentage of pollen germination than the pollen viability in *Eichhornia crassipes.* The claim of Banerji and Gangulee (1937) and Dharurkar (1971) is challenged by Salgare (1986b, 95, 2000a, 06a, f, i k, n, 07a-e, h-i, k-n, q-s) who stated that the observations of Banerji and Gangulee (1937) and Dharurkar (1971) are exaggerating.

Even the lowest concentration of sodium arsenite tried (10^{-17} mg/ml) suppressed the germination of pollen of F-24 series of all the cultivars of brinjal investigated (Table 1). Similar observations were also made by Salgare (1983-Ph.D. Thesis) with F-24 series of red-flowered cultivar of *Nerium odorum*, F-48 and F-72 series of pink-flowered cultivar of *Catharanthus roseus*, by Sharma (1984-Ph.D. Thesis) with F series of duet, all the 3 cultivars of cascades of F-48 series and except for red cascade all the cultivars investigated of F-24 series of