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A Review:

Evaluation of heavy metal (copper sulphate - supplied through water) as male gametocide on *Vigna unguiculata* (L.) walp. and Salgare's method of plant breeding: further evidence of a criticism of Banerji and Gangulee (1937), Dharurkar (1971 - Ph.D. Thesis), Nair, Nambudiri, Thomas (1973), 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, Haldar (1980), Shetye (1982 - Ph.D. Thesis) and Giridhar (1984 - Ph.D. Thesis)

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ABSTRACT

Copper sulphate showed the gametocidic behaviour on *Vigna unguiculate*. The treatment of all the concentrations of copper sulphate inhibited the germination of pollen as well as tube growth of all the 4 series of *Vigna unguiculate* investigated.

Key words : Genetics and Plant Breeding, Palynology, Crop Physiology, Heavy metals.

Copper is an essential and beneficial element in human metabolism. A deficiency in copper results in nutritional problems in infants. Small amounts are not generally regarded as toxic, but very large doses may cause sickness and in extreme cases liver damage.

MATERIALS AND METHODS

Certified seeds of *Vigna unguiculata* (L.) Walp. Var Pusabarsati (cowpea) of Delhi were obtained from the authorized dealers. Healthy seeds were selected to study the effect of copper sulphate. 20 seeds of *V. unguiculata* were sown in white-transparent polythene bags (35x25 cm) containing garden soil and each bag was treated with a 500 ml of different concentrations (0.001, 0.01, 0.1, 1, 10, 100, 1000 mg/ml) of copper sulphate immediately after sowing the seeds. The treatment was given on every alternate day till the life cycle of the crop. A set of control plants was also grown simultaneously with only water in the same quantity as the treated sets. Excess plants were removed after 15 days of sowing leaving the identical and healthy 5 plants in each bag with 10 replicates of each treatment. The observations regarding mortality, morphology, anatomy, phenology *etc.* were recorded on every alternate day. After 5 weeks of uniform flowering, 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) were plucked at the same time after the dehiscence of anthers (in open flowers). Pollen viability was tested by using 2,3,5-Triphenyl tetrazolium chloride (Hauser and Morrison, 1964). To find out the germination potential of pollen in the bud stage of floral development, the flower buds of various sizes marking the various stages of development and the open flowers were plucked at the same time, after the dehiscence of the anthers (in open flowers). Germination of pollen grins of successive flowers was studied by standing-drop technique in an optimum concentrations of sucrose as: 10% sucrose for F-24 and F-48 series, 20% sucrose for F-72 series and 50% sucrose for F series. The cultures were then transferred to a moist filtered chamber, stored at room temperature (25-31°C) having RH of 56% and in diffuse laboratory light. The experiments were run in triplicate and average results were recorded. Observation were made by 24 hours after incubation. For each experiment a random count of 100 grains was made (from different fields of the slide) to