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EFFECT OF PRE-SOWING TREATMENTS ON GERMINATION AND VIGOUR OF SEED IN MARIGOLD (*Tagetes erecta* L.)

P. SELVARAJU AND JACQUELINE A. SELVARAJ
Dept. of Seed Technology, TNAU, Coimbatore.

ABSTRACT

Among the different chemicals used in pre-sowing treatment, the maximum augmentation on seed quality attributes in terms of germination and vigour was obtained with potassium nitrate. Pre-soaking seed treatment with 0.75% potassium nitrate for 16 h. was found to improve germination (89.5%) and vigour potential in terms of root and shoot length, dry matter production and vigour index.

Many viable seeds do not germinate when placed in conditions which are favourable to germination. Such seeds are said to be in a state of dormancy.

In Marigold, the seed dormancy persists for a period of about six months (Ramakrishnan *et al.*, 1970). However, dormant seeds can be induced to germinate by various special treatments. In view of this, the study was undertaken to tackle the problems of seed dormancy.

MATERIALS AND METHODS

Seeds of Marigold cv. Spungold were upgraded by alcohol floatation technique. Then the upgraded seeds were dried to 7 ± 0.5 per cent moisture content and given the following treatments. Untreated seeds (Control) and soaking the seeds in distilled water constituted T_0 and T_1 respectively. Then soaking the seeds in mixtalol, potassium nitrate and thiourea at the rate of 0.25%, 0.50%, 0.75%, 1.00% and 1.25% respectively representing from T_2 to T_{16}.

The seed were soaked for a period of 16 h in the chemicals. After soaking, the seeds were washed free of the chemicals with water and shade dried. Seed samples were taken at random and tested for the following seed quality attributes like, germination (ISTA, 1985), root and shoot length, dry matter production,and vigour index (Abdul Baki and Anderson, 1973).

Table 1. Effect of pre-sowing treatments on germination (%), root length (cm), shoot length (cm), dry matter production (mg) and vigour (VI) in cv.Spungold.

Treatments	Germination (%)	Root length (cm)	Shoot length (cm)	Dry matter production (mg)	Vigour index (VI)
T_0	60.5	6.8	5.2	16.0	723
T_1	69.0	6.9	5.3	16.0	839
T_2	70.0	7.0	5.3	16.5	858
T_3	72.0	7.0	5.4	17.0	893
T_4	80.0	7.3	5.6	17.5	1028
T_5	62.0	7.2	5.3	18.5	772
T_6	61.0	7.1	5.3	18.0	383
T_7	78.0	7.2	5.2	17.0	956
T_8	85.0	7.3	5.3	17.0	1063
T_9	89.5	7.1	5.4	18.0	1115
T_{10}	76.5	7.0	5.3	17.5	941
T_{11}	74.0	7.2	5.2	17.0	903
T_{12}	75.5	7.1	5.2	15.5	949
T_{13}	69.0	7.0	5.3	15.0	849
T_{14}	54.0	6.8	5.1	14.5	648
T_{15}	49.5	6.8	5.0	14.0	584
T_{16}	46.0	6.8	5.0	14.5	541
CD	2.7	0.13	0.21	1.37	40.0

It was computed using the following formula and expressed as whole number.

Vigour index = Germination percentage x
Mean length of normal seedlings.

The data collected were analysed statistically.

RESULTS AND DISCUSSION

Significant differences were observed between seed treating chemicals and their concentrations in respect of germination, root length, shoot length, dry matter production and vigour (VI) of seed (Table 1).

In the present investigation, the chemicals showed variable effects not only between one another but also between the varying concentrations within the same chemical. Thus all concentrations of potassium nitrate, upto 0.75% followed by mixtalol (Paras) enhanced germination. But, the magnitude of increase was maximum with 0.75% of potassium nitrate followed by 0.5% of the same. Seeds soaked at 0.75% of potassium nitrate recorded an increase of 29.0% and 392 over the untreated control (dry seed) in germination and vigour index respectively. It is plausible that many nitrogen containing compounds might stimulate germination by increasing the seed cytokinin content occurring naturally in seeds to interact with growth inhibitors and control the matabolic process preceding germination (Khan, 1980).

Pre-sowing treatments of seed with the aforesaid chemicals proved distinctly superior to soaking in water and dry seed as well. In the absence of pre-sowing treatment with chemicals, mere water soaking is advocated because of its superior performance to dry seed.

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REFERENCES

ABDUL BAKI, A.A. and ANDERSON, J.D. 1973. Vigour determination in Soyabean seed by multiple criteria. **Crop Sci., 13**:630-633.

ISTA, 1985. International Rules for Seed Testing. **Seed Sci. Technol., 13**: 299-355.

KHAN, A.A. 1980. **The Physiology and Biochemistry of Seed Dormancy and Germination** (Ed.A.A. Khan). P.127 North Holland Publishing Company, Amsterdam, New York, Oxford 1980.

RAMAKRISHNAN, V., MOHAMED ALIKHAN, W and MAHABOOB ALIKHAN, A.M. 1970. Studies on the germination of seeds of a few ornamental flowering annuals. **South Indian Hort., 18** : 93-95.

RESEARCH NOTES

ENHANCEMENT OF NITROGEN FIXATION IN SOYBEAN BY THE DUAL INOCULATION OF VA-MYCORRHIZA AND BRADYRHIZOBIUM

In order to assess the role of VAM along with *B.japonicum* on the growth, nutrient uptake and the N_2 fixing efficiency of soybean, a pot culture experiment was conducted at the Agricultural College, Madurai, during 1989.

The pot culture experiment consisted of four inoculation treatments *viz.*, (a) uninoculated control, (b) *Bradyrhizobium japonicum*, (c) *Glomus fasciculatum* and (d) *B.japonicum* + *G. fasciculatum* with two levels of 15_N isotope (O and 20 kg N/ha). Peat based Bradyrhizobial culture (10^8 cells/g peat) SB 101 treated soybean (cv. Co.1) seeds were sown in plastic buckets. Bulk inoculum of *G.fasciculatum* (multiplied in *Panicum* roots) was applied 2.5 cm below the soil surface at the rate of 30 g/pot (50 spores/g). The properties of the soil were as follows : sandy loam pH 7.8; EC 0.56 m.mhos/cm; available N 285.5 kg/ha; P_2O_5 10.2 kg/ha; K_2O 246.4 kg/ha. The soil was sterilized in an autoclave and used for the study.

Twenty gram of ^{15}N urea (5% atom excess) equivalent to 20 kg N/ha (recommended level) on soil weight basis were added after the germination of soybean seeds. The phosphorus and potassium were applied at the rate of 80 and 40 kg. of P_2O_5 and K_2O respectively. The total dry weight of the plant, P uptake and VA-mycorrhizal colonization in roots (Phillips and Hayman, 1970) were estimated on 30, 60 and 90th day after sowing. Apart from that the 15_N enrichment of the plant samples (Fielder and Prosksh, 1975) was recorded on 30 and 60 days of plant growth.

Inoculation of VAM fungus significantly improved the plant dry weight throughout the crop