

Note

## Effect of seaweed concentrate on growth and development of the marigold *Tagetes patula*

J. van Staden, S. J. Upfold & F. E. Drewes

Natal University Research Unit for Plant Growth and Development, Department of Botany, University of Natal, Pietermaritzburg 3200, South Africa

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### Abstract

The seaweed concentrate Kelpak, made from *Ecklonia maxima*, and applied as a foliar spray or a root drench at transplanting, improved both the vegetative and reproductive growth of marigolds. Of particular significance is that the overall production of seeds (fruits) was increased by as much as 50% in some instances. Very low concentrations of seaweed concentrate were not always effective, while the higher dosages decreased vegetative growth.

While the active compounds are unknown seaweed products are now widely used as biostimulants in agriculture and horticulture (Crouch & Van Staden, 1993; 1994). Aldworth and Van Staden (1987) reported increased vegetative growth when seedlings were treated with seaweed concentrate at transplanting. These findings have been substantiated for both bedding plants (Russo *et al.*, 1994) and forest seedlings (Atzmon & Van Staden, 1994). No reports dealing with flowering and seed production are available. In this study we investigated the effect of Kelpak seaweed concentrate, prepared from *Ecklonia maxima*, on the vegetative and reproductive growth of *Tagetes patula*.

Seeds of *Tagetes patula* cv. Janie were germinated and left until the 4-leaf stage, whereafter seedlings were selected for uniformity and then transplanted into pots filled with a sand:loam:peat (1:2:1) medium. At transplanting seedlings were sprayed or soil drenched with the equivalent of 0, 0.5, 1.0 or 2.0 ml of seaweed concentrate. Forty pots were used for each treatment. Plants were maintained in a greenhouse and watered every second day with 50 ml tap water. Nine weeks after seaweed concentrate application 10 plants were harvested from each treatment and vegetative growth parameters recorded. The remaining 30 plants of each treatment were left to obtain data with respect to flow-

ering and seed production. The number of seeds (fruits) produced per flower head was determined and the overall seed production of the plants ascertained. All results were subjected to a one-way analysis of variance and a multiple range test conducted.

From Table 1 it is clear that the overall shoot growth of the marigolds was improved by seaweed concentrate application, particularly so where applied as a root drench or foliar spray at 1 ml per plant at transplanting. Overall the seaweed concentrate-treated plants were greener in colour, they were bigger and looked more healthy. The plants treated with the higher levels of seaweed concentrate (1 and 2 ml) produced more flowers relative to the untreated control plants, particularly when applied as a soil drench (Table 1). The average number of seeds produced per flower head at senescence was increased significantly where the seaweed concentrate was applied as a foliar spray for all concentrations tested, and as a root drench at 1 ml. Of great significance is that the average number of seeds per plant was significantly increased by all the seaweed concentrate treatments. The 1-ml application rate produced the best results.

Earlier experiments conducted under field and greenhouse conditions (Aldworth & Van Staden, 1987; Russo *et al.*, 1994) reported improved growth and