

Effect of sargassum and turbinaria seaweed extracts on physiological and yield attributes in pigeonpea (*Cajanus cajan* (L.) Millsp.)

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ABSTRACT

The study was attempted to identify the influence of Turbinaria and Sargassum extracts on growth and yield parameters in pigeonpea. Foliar spray of seaweed extracts at 2.5 and 5.0 per cent concentrations was given at vegetative and flowering stages. Both the seaweed extracts improved the growth and yield attributes but the effect was more pronounced with Sargassum. Indices of growth viz., plant height, root length and dry weight, physiological attributes viz., chlorophyll content, leaf area and leaf area duration and yield components, number of pods and grain weight were improved by seaweed application. Higher uptake of nitrogen, phosphorus and potassium was also evident in the treated plots. It is presumed that growth regulator like substances present in the seaweed extracts would have elicited positive responses in physiological and growth characters, resulting in enhanced yield.

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Key words : Sargassum, Turbinaria, Seaweed extract, Pigeonpea, Growth, Yield

INTRODUCTION

Commercial exploitation of seaweeds has met with varying degrees of success owing to conflicting views on the influence of seaweeds (Finnie and Van Staden, 1985) on yield improvement. However, the adverse effects of synthetic fertilizers upon environment, necessitate identification of bio-stimulants and organic manures for usage as foliar and soil amendments (Quastel and Webley, 1947; Metting *et al.*, 1991) for enhancement of yield in agricultural crops. Natural form of manures using seaweeds, not only supply major nutrients but also add trace elements and metabolites that mimic growth regulators. They are easy to apply, relatively cheap and can represent an alternative to conventional synthetic fertilizers and enhance germination and growth (Sekar *et al.*, 1995). Research work on the exploitation of seaweeds on growth and yield of agricultural crops is scanty and few studies available have been restricted to germination and early stages of growth (Gandhiappan and Perumal, 2001) in sesamum; Thirumal Thangam *et al.*, 2004 in guar). The standing crop of seaweeds in intertidal and shallow water in India accounts for 91,000 tons and that of deepwater resources for 75,000 tons and these remain mostly underutilized for crop production (Kaliaperumal *et al.*, 2004). Pigeonpea [*Cajanus cajan* (L.) Millsp.], one of the important pulse crops, occupies an area of 77.5 per cent with a production of 81.0 per cent of total

pulses (Ahlawat *et al.*, 2005). Being an important supplement for protein to majority of Indian population, pigeonpea production oriented towards organic cultivation will be worth attempting. Against this background, experiments were initiated using two seaweeds viz., *Turbinaria conoides* and *Sargassum polycystum* through foliar spray in pigeonpea to assess their effect on physiological and growth attributes.

MATERIALS AND METHODS

The seaweeds belonging to the order Phaeophyta (brown marine algae) viz., Turbinaria and Sargassum, collected from Central Marine Fisheries Institute, Indian Council of Agricultural Research, Mandapam, located in the South east coast of Tamil Nadu, India were washed thoroughly and dried under sun followed by oven drying for 36 h at 40^o C and powdered. 500 g of dry powder was soaked in 100 ml of alcohol for 12 h and shaken vigorously to dissolve the alcohol soluble constituents and the supernatant separated. The residue was boiled with 100 ml of distilled water for 30 min cooled and filtered. Alcohol and water-soluble constituents were mixed and the volume was made up to 500 ml with water to constitute 100 per cent extract. From this 2.5 and 5.0 per cent concentrations were prepared and used.

The field experiment was carried out at Agricultural College and Research Institute, Madurai (9^o5' North and

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