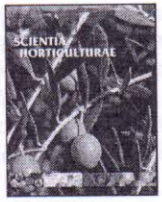
Scientia Horticulturae 173 (2014) 86–91

Contents lists available at ScienceDirect

Scientia Horticulturae

journal homepage: www.elsevier.com/locate/scihorti



Glomus–Azotobacter association affects phenology of mango seedlings under reduced soil nutrient supply

Som Dev Sharma[a], Pramod Kumar[b,*], Shailendra Kumar Yadav[c]

[a] Regional Horticultural Research & Training Station, Dr Y S Parmar University of Horticulture & Forestry, Bajaura, District Kullu, Himachal Pradesh, India
[b] Regional Horticultural Research & Training Station, Dr Y S Parmar University of Horticulture & Forestry, Sharbo, District Kinnaur, Himachal Pradesh, India
[c] Central Soil and Water Conservation Research and Training Institute (ICAR), Research Centre, Datia, Madhya Pradesh, India

ARTICLE INFO

Article history:
Received 30 March 2014
Received in revised form 25 April 2014
Accepted 30 April 2014
Available online 20 May 2014

Keywords:
Arbuscular mycorrhiza
Glomus fasciculatum
Growth promotion
Nursery
Reduced N + P inorganic fertilization

ABSTRACT

The aim of this research was designed to determine the effectiveness of indigenous arbuscular mycorrhizal (AM) fungal species *Glomus fasciculatum* (Thaxter sensu Gerdemann), *Glomus magnicaulis* (Hall) and *Azotobacter* strains on growth promotion of mango seedlings under limited nitrogen (N) and phosphorous (P) soil fertilization for sustainable nursery management in rainfed ecosystem. Three districts in the state of Himachal Pradesh namely, 'Kangra', 'Hamirpur' and 'Bilaspur' being located in the Shiwalik hill range of north-western Himalayas of India were selected purposely to measure the intensity of occurrence and distribution of indigenous AM fungal species and *A. chroococcum* strains in local 'Dasheheri' mango orchards. AM fungi viz., *G. fasciculatum* (Thaxter sensu Gerdemann), *G. magnicaulis* (Hall), *G. mosseae* (Nicol. and Gerd.) and *Gigaspora heterogamma* (Nicol. and Gerd.), and two strains of *A. chroococcum* viz., AZ_1 and AZ_2 were predominant in the rhizosphere soil of the orchards. The data inferred that AM fungal spore load, root colonization and *A. chroococcum* bacterial count in different locations ranged from 2150–2975 spores kg^{-1} of the moist soil, 8.5–11.8% and 3.1×10^6–4.7×10^6 colony forming units (cfu), respectively. Soil type of the orchards varied between sandy loam and clay loam. To assess the comparative effectiveness of AM species and *Azotobacter* strains, the inocula were screened alone and in dual combination at different levels of N and P inorganic fertilizers. The inocula of potent isolates/strains i.e., *Glomus fasciculatum*, *G. magnicaulis*, AZ_1 and AZ_2 were multiplied and inoculated under varied N and P fertilization in the ratio of 12:4 g kg^{-1} i.e. 2/3 N + P, 3/4 N + P and full N + P. Vegetative development affected by the mycorrhizal and bacterial inoculation was more pronounced when seedlings were inoculated with *G. fasciculatum* followed by *G. magnicaulis* with AZ_1 and/or AZ_2 alone, and in dual combination at 2/3 dose of N + P. The inoculation of either of AM fungal species and/or bacterial strains led to a significant increase in plant height, stem diameter, leaf area and total root length in comparison to non-inoculated control, and was also demonstrated with *G. fasciculatum* and AZ_1 stimulated maximum growth of the seedlings in reduced N and P inorganic fertilizer sources. Considering the overall results, *G. fasciculatum* and AZ_1 had a greater effect on vegetative growth promotion in reduced soil nutrient supply on mango seedlings.