

Arbuscular mycorrhizal fungal symbiosis with *Sorbus torminalis* does not vary with soil nutrients and enzyme activities across different sites

ABSTRACT

Effects of soil chemical properties on arbuscular mycorrhizal fungal (AMF) symbiosis with wild service tree (*Sorbus torminalis* L. Crantz) were examined for study the rates of root colonization at three forest sites: Kheiroud, Lalis, and Takrin in northern Iran. Soil characteristics including pH, available phosphorus (P), potassium (K), organic matter, total nitrogen, acid and alkaline phosphatase activities, CaCO₃, spore density (SD) and AMF colonization of soil and root samples were analyzed. The study sites were investigated in spring and autumn to highlight the effects of soil chemical properties on AMF statuses for better nurseries and reforestation management of this rare tree species in forests. Changes in soil pH, P, K, organic matter, total nitrogen, acid and alkaline phosphatase, CaCO₃, SD, and AMF colonization of soil and root samples were analyzed at the study sites. K, pH, root colonization, SD and acid phosphatase activity showed no significant differences among sites in spring and autumn, while total nitrogen, P, organic matter and alkaline phosphatase activities showed significant differences among sites and seasons. AMF colonization rates were more than 51% and 32% of roots in spring and autumn, respectively. No correlation between root colonization and soil chemical parameters in spring and autumn were detected. There was no correlation between percentage of AM root colonization and SD nor other soil parameters in spring and autumn. SD and CaCO₃ were significantly negatively correlated in spring and autumn. Despite differences in soil characteristics, the results showed that SD and root colonization were not significantly different among the sites. They also showed that wild service trees had strong symbiosis with AMF, while soil properties might not have a significant effect on this symbiosis. Therefore, colonized seedlings can be considered as an appropriated method for reforestation and conservation of this rare tree species.

Keyword: Arbuscular mycorrhizae; Soil nutrients; Colonization; Soil enzyme; *Sorbus torminalis*