**Abstract**

Soil acidity is a major constraint for crop production worldwide as nearly half of the potential arable lands are acidic. Plant productivity in acid soils is limited by toxic levels of aluminum (Al), manganese (Mn), and iron (Fe) as well as deficiencies of plant available nutrients, especially phosphorus (P). Plants have developed several morphological, biochemical, and physiological adaptations against acidity stress. Among these, symbiosis with arbuscular mycorrhizal (AM) fungi is a strategy plants have evolved to survive and thrive in acid soils. The AM symbiosis increases plant growth in acid soils through enhanced uptake of nutrients. A reduction in Al and Mn phytotoxicities also occurs in response to AM symbiosis through a number of mechanisms such as binding of the toxic ions by the fungal hyphae, vesicles or auxiliary cells, exudation of organic acids, phosphatases, and production of glomalin. However, like plants, AM fungal species and ecotypes also vary to a great extent in their tolerance and ability to impart plant growth benefits in acid soils. It is, therefore, essential to identify suitable AM fungi that could confer tolerance and render maximum benefits to crops in acid soils.