Abstract Three levels of zinc fertilization (0, 5, 10 mg/kg) and an arbuscular mycorrhizal (AM) fungus Glomus intraradices were tested for their potential to control Pythium deliense on inoculated cucumber seedlings. Plant Zn, N, P, K, Mg, Ca, Fe, Mn, Cu contents, dry and fresh weights of plant and roots and disease severity were determined in the study. Resistance to Pythium rot was determined with the application of mycorrhiza with increasing doses of zinc. Zinc and mycorrhizal fungus applications had significant effects on plant nutrition except for K and Cu. While the highest N and P concentrations were noted under Zn0 conditions, the values obtained under Zn1 and Zn2 conditions showed differences depending on G. intraradices and P. deliense treatments. Leaf Ca concentration reached up to highest level with Zn2GI0Pd1 treatment and the lowest Ca content was recorded under GI0Pd0 for all Zn applications. Lower level of zinc together with GIp0 applications resulted in the highest leaf Mg concentration. The highest micronutrient concentrations were analysed on cucumber plants grown under Zn deficient conditions without GI but with P. deliense. Plant dry weight, root fresh and root dry weights were higher in cucumber plants challenged with AM fungus and P. deliense under zinc applied conditions. It was observed that certain rates of zinc and mycorrhiza based-treatments had positive effects on disease factors by suppressing Pythium rot and can be used for biological control.