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Abstract

Various effects of the dry deposition of soot on maize were investigated in Keszthely (Hungary) in two consecutive years. In order to be able to study a wider range of weather conditions, some of the plants were placed in a Thornthwaite-Matter type evapotranspirometer and given ad libitum water supplies. Pollution with airborne black carbon was simulated throughout the season by distributing rates of 3 g?m^{-2} a week using a motorised dust sprayer. Among the plant growth parameters, the leaf area index was increased by 3% - 14%, depending on the year, suggesting that the plants were able to absorb the carbon settling on the leaves. The black carbon reduced the albedo of the canopy by 17.5% - 21.8%, depending on the year, forcing the polluted maize to absorb more energy. Part of this surplus energy was utilised for increased evapotranspiration (3.9% and 11% in the two years) and to raise the surface temperature of the canopy by 1℃ - 2℃ during the mid-day hours. The effect of the contamination on maize was more intense in the hot, dry year. The unfavourable effect of soot on maize fertilisation could be observed as a significant increase in the number of deformed ears, leading to a reduction in grain dry matter. The reduction in dry matter yield for polluted maize grown with irrigation in the evapotranspirometer was far less severe than that on non-irrigated plots, suggesting that irrigation was the most obvious solution for mitigating the negative effects of contamination with airborne soot.