

POLYETHYLENE MULCHING EFFECTS ON SOIL PROPERTIES AND PHYSIOLOGICAL TRAITS IN TOMATO UNDER ECOLOGICAL CROP TECHNOLOGY

Ligia ACATRINEI¹, Feodor FILIPOV²

e-mail: ligia.acatrinei@icbiasi.ro

Abstract

The aim of this study is to assess the influence of covering with black polyethylene mulch on soil properties and also over plant physiological behavior. Analyzed gas-exchange parameters were: soil net CO₂ exchange rate (NCER), soil respiration (Ce) and water humidity (W flux) as soil indicators and photosynthetic rate, transpiration, and stomatal conductance and also sugars leaf content as plant physiological indicators.

Plant material was Prekos tomato variety cultivated in protected organic system at The Vegetable Research and Development Station Bacau (SCDL Bacău). Our analysis showed that black plastic mulch on the soil surface favored soil compaction especially on the space between tomato plant rows. The strong soil compactness state was reflected by the high bulk density values and other indicators as smooth soil surface and the cracks networks. In variant with no black plastic cover, soil gas-exchange showed that net CO₂ exchange rate of was 7.94 μmol m⁻²s⁻¹ and soil CO₂ flux as soil respiration was 77.4 μmol m⁻²s⁻¹ both higher in comparison with black polyethylene covering variant. In variant with black plastic cover because of higher soil moisture under polyethylene the water flux between air and soil are increased. Photosynthesis registered a slight increase, having the value of 10 μmol m⁻²s⁻¹ in flowering phenophase (June) and about 11 μmol m⁻²s⁻¹ in ripening phenophase (July) in uncovered with polyethylene variant. During the studied period, the variant uncovered with black plastic (polyethylene) registered a small variation of the photosynthesis rate but a higher mean value than covered variant. Covered variant registered a higher value in the flowering phenophase and a smaller value in ripening stage.

Key words: polyethylene much, Prekos tomato variety, soil respiration, photosynthesis, sugar leaf
