



Evolution and behaviour of hydromulches in organic woody crops under open field and container conditions.

Marta M. Moreno¹, Jaime Villena¹, Sara González Mora¹, Pablo A. Morales¹, Concepción Atance¹, Carlos Ortega¹, Antonio Ruiz-Orejón², Juan A. Campos¹, and Carmen Moreno¹

¹University of Castilla-La Mancha, School of Agricultural Engineering / Escuela de Ingenieros Agrónomos, Vegetal Production and Agriculture Technology, Ciudad Real, Spain (martamaria.moreno@uclm.es)

²C.A. "El Chaparrillo". IRIAF

The use of hydromulches in agriculture is being investigated nowadays by different research groups in their search for harmless materials which mainly exert a reasonable weed control and allow saving crop water consumption by reducing soil evaporation, both in open field as in container nurseries. To achieve these goals, these materials would avoid, or at least reduce, the use of chemical herbicides or plastic mulches derived of non-renewable sources, with the environmental, economy and energy effect it implies, aspects clearly appreciated in organic farming. However, one of the most important problems associated to the hydromulches is their degradation process and their useful life, because, due to their organic origin, may disappear early and therefore not fulfil their function.

For this reason, in both an intensive almond crop planted in the open field and in young olive trees grown in big containers, we evaluated the evolution and disintegration process of different mixtures based on by-products derived from the agricultural sector (barley straw, rice husk, rests from mushroom production, pruning wood chips), mixed with a binder and recycled paper paste and applied in liquid form on the ground with subsequent solidification (hydromulch). For that, we focused on the evolution of the continuous formation of cracks (shape and size), thickness, puncture resistance and ground cover by the material.

In summary, and a basis for future tests, the main conclusion derived from the results is the importance of keeping the hydromulch materials as dry as possible. We have been able to verify that, when the material gets wet (either by irrigation water, or by rain or fog), it softens, thus losing its puncture resistance and disappearing early. In addition, when the material becomes wet, the attack of the fauna (rabbits, wild boars, birds, etc.) intensifies, accelerating the process of deterioration of the hydromulch installed on the field. In relation to the materials tested, the hydromulches based on rests from mushroom production undergoes strong and early disintegration, integrating completely into the soil, especially in field conditions. The best results in terms of permanence and stability throughout the trials were obtained in rice husk and pruning wood chips, which would position these mixtures as interesting alternatives especially in container crops, important for nursery crops.

Keywords: hydromulches, deterioration, puncture resistance, organic farming.

Acknowledgements: Project RTA2015-00047-C05-03 - INIA (Spanish Ministry of Economy and Competitiveness).