

 Open access • Journal Article • DOI:10.1016/J.CATENA.2018.11.007

Straw mulch as a sustainable solution to decrease runoff and erosion in glyphosate-treated clementine plantations in Eastern Spain. An assessment using rainfall simulation experiments — Source link

Saskia Keesstra, Saskia Keesstra, Jesús Rodrigo-Comino, Agata Novara ...+4 more authors


Institutions: Wageningen University and Research Centre, University of Newcastle, University of Trier, University of Palermo ...+3 more institutions

Published on: 01 Mar 2019 - Catena (Elsevier)

Topics: Mulch, Surface runoff, Erosion, Straw and Drip irrigation

Related papers:

- [Soil-related sustainable development goals: Four concepts to make land degradation neutrality and restoration work](#)
- [The significance of soils and soil science towards realization of the United Nations sustainable development goals](#)
- [Hydrological and erosional impact and farmer's perception on catch crops and weeds in citrus organic farming in Canyoles river watershed, Eastern Spain](#)
- [An economic, perception and biophysical approach to the use of oat straw as mulch in Mediterranean rainfed agriculture land](#)
- [Policies can help to apply successful strategies to control soil and water losses. The case of chipped pruned branches \(CPB\) in Mediterranean citrus plantations](#)

Share this paper:    

View more about this paper here: <https://typeset.io/papers/straw-mulch-as-a-sustainable-solution-to-decrease-runoff-and-3qalhtp48>

Document downloaded from:

<http://hdl.handle.net/10251/145408>

This paper must be cited as:

Keesstra, S.; Rodrigo-Comino, J.; Novara, A.; Giménez Morera, A.; Pulido, M.; Di Prima, S.; Cerda, A. (03-2). Straw mulch as a sustainable solution to decrease runoff and erosion in glyphosate-treated clementine plantations in Eastern Spain. An assessment using rainfall simulation experiments. CATENA. 174:95-103. <https://doi.org/10.1016/j.catena.2018.11.007>



The final publication is available at

<https://doi.org/10.1016/j.catena.2018.11.007>

Copyright Elsevier

Additional Information

Title Straw mulch as a sustainable solution to decrease runoff and erosion in glyphosate-treated clementine plantations in Eastern Spain. An assessment using rainfall simulation experiments

Author(s) Keesstra, S.D.; Rodrigo-Comino, J.; Novara, A.; Giménez-Morera, A.; Pulido, M.; Prima, S. Di; Cerdà, A.

Source Catena 174 (2019). - ISSN 0341-8162 - p. 95 - 103.

DOI <https://doi.org/10.1016/j.catena.2018.11.007>
Alterra - Soil, water and land use

Department(s) PE&RC
Soil Physics and Land Management

Publication type Refereed Article in a scientific journal

Publication year 2019

Keyword(s) Clementine - Detachment - Erosion - Rainfall simulation - Runoff generation - Straw mulch

Abstract In many Mediterranean areas, citrus orchards exhibit high soil loss rates because of the expansion of drip irrigation that allows cultivation on sloping terrain and the widespread use of glyphosate. To mitigate these non-sustainable soil losses, straw mulch could be applied as an efficient solution but this has been poorly studied. Therefore, the main goal of this paper was to assess the use of straw mulch as a tool to reduce soil losses in clementine plantations, which can be considered representative of a typical Mediterranean citrus orchard. A total of 40 rainfall simulation experiments were carried out on 20 pairs of neighbouring bare and mulched plots. Each experiment involved applying 38.8 mm of rain at a constant rate over 1 h to a circular plot of 0.28 m² circular plots. The results showed that a cover of 50% of straw (60 g m⁻²) was able to delay the time to ponding from 32 to 52 s and the time to runoff initiation from 57 to 129 s. Also, the mulching reduced the runoff coefficient from 65.6 to 50.5%. The effect on sediment transport was even more pronounced, as the straw mulch reduced the sediment concentration from 16.7 g l⁻¹ to 3.6 g l⁻¹ and the soil erosion rates from 439 g to 73 g. Our results indicated that mulching can be used as a useful management practice to control soil erosion rates due to the immediate effect on high soil detachment rate and runoff initiation reduction in conventional clementine orchards on sloping land, by slowing down runoff initiation and by reducing runoff generation and, especially, sediment losses. We indirectly concluded that straw mulch is also a sustainable solution in glyphosate-treated citrus plantations.