18th European Weed Research Society Symposium

EWRS 2018

17-21 June 2018
Ljubljana, Slovenia

New approaches for smarter weed management

Book of Abstracts

www.ewrs2018.org

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Organiser
Kmetijski inštitut Slovenije (KIS) – Agricultural Institute of Slovenia, Hacquetova ulica 17, 1000 Ljubljana, Slovenija

Editor
Andrej Simončič

Published by
Kmetijski inštitut Slovenije, 2018

The publication is published e-only – http://www.ewrs.org

Kataložni zapis o publikaciji (CIP) pripravili v Narodni in univerzitetni knjižnici v Ljubljani
COBISS.SI-ID=295336960
ISBN 978-961-6998-21-5 (pdf)

Weed control in rice grown with plastic mulching and drip irrigation system

Aldo Ferrero, Marco Milan, Fernando De Palo, Silvia Fogliatto, Francesco Vidotto
University of Torino, GRUGLIASCO, Italy

Plastic mulching and drip irrigation in organic rice cultivation are practices aimed at controlling weeds and saving water. A study was conducted in 2016 and 2017 to test the combination of both techniques in a rice field in N-W Italy. The field was equipped with a subsurface drip irrigation system and subdivided in three plots (split-plot design), in which rice was mulched with biodegradable films of different thickness: one black in color and with a thickness of 15 µm and two with a thickness of 12 µm, one black and one transparent. An adjacent drip irrigated field was dry seeded and used as a reference. Rice seeding was performed in May and the mulched plots were sown with a plastic sheet laying and planting machine. The mulched strips were 140 cm wide and hosted 5 rice rows, while the bare soil between the mulched strips (inter strip) was 70 cm wide. The amount of water supplied to the field over the whole growing season was about 4500 m^3/ha. Weeds grown in the inter strips were controlled with a modified inter-row hoeing. During the season, weed and rice density, rice height, number of dead rice plants, weed control efficacy in the inter strips and rice yield were assessed in all plots. The result of the study showed that in the inter strips, weed density at the final assessment was higher in the 15 µm black film (403 plants m^{-2}) and lower in the transparent film (126 plants m^{-2}), while the number of rice culm per meter had an opposite trend. Highest yield was recorded in conventional field (7.8 t ha^{-1}), followed by 15 µm black film with 3.7 t ha^{-1}, while the lowest were those recorded with 12 µm black and transparent films (2.3 and 2.4 t ha^{-1}, respectively).