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#### **ABSTRACT**



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## AGROECOLOGICAL APPROACH TO REDUCE ENVIRONMENTAL IMPACTS AND INCREASE BIODIVERSITY IN FORAGE SYSTEMS SERVING DAIRY FARMS

Francesco Ferrero<sup>1</sup>, Ernesto Tabacco<sup>1</sup>, Luciana Tavella<sup>1</sup>, Giorgio Borreani<sup>1</sup>

<sup>1</sup>*Department of Agricultural, Forest and Food Sciences (DISAFA), University of Torino, 10095 Grugliasco (TO)*

*Corresponding author: francesco.ferrero@unito.it*

This work investigated herbaceous plant diversity, carabid and butterfly assemblages, earthworm richness in an intensively managed agricultural area in northern Italy. We hypothesized that lowering the intensity of agricultural practices, measured as Carbon Footprint (CF), without lowering the yield potential, could contribute to reducing the loss of biodiversity at field level. Samples were collected in fields and field margins on farms that represent three cropping systems and five different intensity levels of agricultural practices: mono-cropped maize with high or low chemical pressure; maize in rotation with alfalfa and low chemical pressure; herbaceous strips with no chemical pressure. The intensity of agricultural practices was computed at field level as CF, nutrient balance, and intensity use of agrochemicals. The intensity of agricultural practices, as quantified in terms of CF, has been correlated to biodiversity indicators, such as species richness and composition of herbaceous plants, carabids, and butterflies. The results from the current research suggest that all species from the intensity agricultural practices in maize observed in the two-year study showed large coefficients of determination between CF and biodiversity indexes. A decrease in species richness was observed as CF and N surplus increased over all the fields and field margins. This suggests that, although only a small fraction of the biodiversity of natural ecosystems comes from cultivated lands, these agricultural areas, because of their extension, could become key components for the conservation of biodiversity, if particular emphasis is paid to the intensity of the adopted agricultural practices. These findings provide further evidence that well-implemented, diverse cropping systems could be a benefit for biodiversity at farm level, without compromising yield potential, and could offer European policy and agricultural decision makers indications for the design of more specific, effective management options for future policy measures.