Session Biosphere: April 12th 11.30 hrs

1s3 The contribution of biodiversity to productivity in circular agriculture

THE IMPACT OF AGRICULTURAL PRACTICES ON THE BIODIVERSITY OF AGROECOSYSTEMS: A LITERATURE REVIEW

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Biodiversity is suffering from an intense and accelerating loss worldwide. The role of agriculture in this is highly relevant, with it affecting biodiversity through its expansion to natural areas or with its intensification. Agriculture, however, remains an essential activity for human existence and with a growing population in the next years, its production and system needs to be improved to be able to support this increasing demand. Balancing increase or maintenance of production levels in agriculture with biodiversity require understanding how agricultural practices affect the biodiversity of agroecosystems. In this study we have conducted a systematic literature review on the impacts of two major groups; aboveground arthropods, represented by bees, wasps and ants and belowground organisms, represented by nematodes, earthworms, bacteria and fungi. The practices were chosen through a preliminary review to select the ones more relevant for biodiversity conservation. We have selected a total of 117 of these papers for the extraction of the effect of their respective practices on the target biodiversity group as positive, negative or neutral based on statistically significant results found in the experiments. The data was then classified based on the methodology used, the scale of the study, the region and whether practices were assessed separately or simultaneously. We then clustered the results by ecoregion to identify varying effects and the total coverage or studies found in terms of different environments. Our data showed that pollinators generally benefit from the presence of natural buffer areas such as field margins and adjacent semi natural areas. For nematodes and earthworms fertilization was the most important factor, with compost and manure presenting overall positive effects on their richness and abundance, with the exception of a single study for compost and two studies for manure with negative effects. In the selected studies there was a bias towards Europe and north America. The reduced number of studies from regions where surrounding natural areas are relatively majorly conserved as well as their neutral results present a limitation in better understanding if agricultural practices play a role in affecting those agroecosystems or are buffered by surrounding natural habitats and areas. Integrating the information of the impact of specific practices on particular taxonomic groups to current biodiversity models would help us better understand and

manage biodiversity within agricultural systems and shift from working with the intensity of agricultural systems as a proxy for biodiversity disruption.

Keywords: Biodiversity, Circularity, Agriculture, Agroecosystems