5.5 Managing crop margins for enhancing the presence of pollinators and natural enemies - the Spanish approach

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Abstract

Nowadays and in the last years, biodiversity matters have become relevant. Different approaches have been set up in agriculture for the benefit of wildlife, and especially for the pollinator conservation (Wratten et al, 2012). An way to introduce conservation measures for increasing biodiversity into agro-ecosystems is by managing the crop margins and introducing flowering plants (Kells et al, 2001; Rands et al 2011). These can offer food and shelter not only for pollinators but for natural enemies as well, helping to mitigate their decline and this has been widely documented (Biesmeijer et al., 2006; Potts et al, 2010). Five years ago the so called 'Operation pollinator' was launched, a European initiative sponsored by Syngenta, active in nine countries. In Spain, the Technical University of Madrid (UPM) and the National Research Council (CSIC) participated in Madrid aiming at identifying a suitable floral mixture and its impact on wild social and non-social pollinators.

During a 3-year study in a rainfed barley crop we have initially identified an optimal floral mixture. The most suitable plant species concerning the blooming period and duration, the coverage and attraction of beneficial fauna were *Borago officinalis* L., *Calendula officinalis* L., *Coriandrum sativus* L. and *Diplotaxis catholica* L. Additionally we have revealed the influence of the floral plants on the number and diversity of pollinators visiting the crop margin. The diversity of visitor species was high and the most common insect orders were Hymenoptera and Diptera. Small solitary bees (< 1 cm long) outnumbered other hymenopteran groups such as honey bees, bumble bees and large solitary bees. And because Central Spain is very dry, we tested in a 2-year study the suitability of the floral mixture in an irrigated melon crop, as well as the influence on the production and quality of the crop. The role of artificial shelters placed near the crop were studied also.

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