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Maintenance of Non-Crop Plants Reduces Insect Pest Population in Tropical Chili Pepper Agroecosystems

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Abstract : Integrating strategies of sustainable crop production and promoting the provisioning of ecological services on farms and within rural landscapes is a challenge for today's agriculture. Habitat management, through increasing vegetational diversity, enhances heterogeneity in agroecosystems and has the potential to improve the recruitment of natural enemies of pests, which promotes biological control services. In tropical agroecosystems, however, there is a paucity of information pertaining to the resources provided by associated plants and their interactions with natural enemies. The maintenance of non-crop plants integrated into and/or surrounding crop fields provides the farmer with a low-investment option to enhance biological control. We carried out field experiments in chili pepper agroecosystems with small stakeholders located in the Zona da Mata, State of Minas Gerais, Brazil, from 2011 to 2015 where we assessed: (a) whether non-crop plants within and around chili pepper fields affect the diversity and abundance of aphidophagous species; (b) whether there are direct interactions between non-crop plants and aphidophagous arthropods; and (c) the importance of non-crop plant resources for survival of Coccinellidae and Chrysopidae species. Aphidophagous arthropods were dominated by Coccinellidae, Neuroptera, Syrphidae, Anthocoridae and Araneae. These natural enemies were readily observed preying on aphids, feeding on flowers or extrafloral nectaries and using plant structures for oviposition and/or protection. Aphid populations were lower on chili pepper fields associated with non-crop plants that on chili pepper monocultures. Survival of larvae and adults of different species of Coccinellidae and Chrysopidae on non-crop resources varied according to the plant species. This research provides evidence that non-crop plants in chili pepper agroecosystems can affect aphid abundance and their natural enemy abundance and survival. It is also highlighting the need for further research to fully characterize the structure and function of plant resources in these and other tropical agroecosystems. Financial support: CNPq, FAPEMIG and CAPES (Brazil).

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