World Academy of Science, Engineering and Technology
International Journal of Environmental and Ecological Engineering
Vol:10, No:04, 2016

Inventory and Pollinating Role of Bees (Hymenoptera: apoidea) on Turnip (Brassica rapa L.) and Radish (Raphanus sativus L.) (Brassicaceae) in Constantine Area (Algeria)

Authors : Benachour Karima

Abstract : Pollination is a key factor in crop production and the presence of insect pollinators, mainly wild bees, is essential for improving yields. In this work, visiting apoids of two vegetable crops, the turnip (Brassica rapa L.) and the radish (Raphanus sativus L.) (Brassicaceae) were recorded during flowering times of 2003 and 2004 in Constantine area (36°22'N 06°37'E, 660 m). The observations were conducted in a plot of approximately 308 m2 of the Institute of Nutrition, Food and Food Technology (University of Mentouri Brothers). To estimate the density of bees (per 100 flowers or m2), 07 plots (01m2 for each one) are defined from the edge of the culture and in the first two rows. From flowering and every two days, foraging insects are recorded from 09 am until 17 pm (Gmt+1).The purpose of visit (collecting nectar, pollen or both) and pollinating efficiency (estimated by the number of flowers visited per minute and the number of positive visits) were noted for the most abundant bees on flowers. The action of pollinating insects is measured by comparing seed yields of 07 plots covered with tulle with 07 other accessible to pollinators. 04 families of Apoidea: Apidae, Halictidae, Andrenidae and Megachilidae were observed on the two plants. On turnip, the honeybee is the most common visitor (on average 214visites/ m2), it is followed by the Halictidae Lasioglossum mediterraneum whose visits are less intense (20 individuals/m2). Visits by Andrenidae, represented by several species such as Andrena lagopus, A.flavipes, A.agilissima and A.rhypara were episodic. The honeybee collected mainly nectar, its visits were all potentially fertilizing (contact with stigma) and more frequent (on average 14 flowers/min. L.mediterraneum visited only 05 flrs/min, it collected mostly the two products together and all its visits were also positive. On radish, the wild bee Ceratina cucurbitina recorded the highest number of visits (on average 06 individuals/100flo wers), the Halictidae represented mainly by L.mediterraneum, and L.malachurum, L.pauxillum were less abundant. C.cucurbitina visited on average 10 flowers /min and all its visits are positive. Visits of Halictidae were less frequent (05-06 flowers/min) and not all fertilizing. Seed yield of Brassica rapa (average number of pods /plant, seeds/ pods and average weight of 1000 seeds) was significantly higher in the presence of pollinators. Similarly, the pods of caged plants gave a percentage of aborted seeds (10.3%) significantly higher than that obtained on free plants (4.12%), the pods of caged plants also gave a percentage of malformed seeds (1.9%) significantly higher than that of the free plants (0.9%). For radish, the seed yield in the presence and absence of insects are almost similar. Only the percentage of malformed seeds (3.8%) obtained from the pods of caged plants was significantly higher in comparison with pods of free plants (1.9%). Following these results, it is clear that pollinators especially bees are essential for the production and improvement of crop yields and therefore it is necessary to protect this fauna increasingly threatened.

Keywords : foraging behavior, honey bee, radish, seed yield, turnip, wild bee
Conference Title : ICBE 2016 : International Conference on Biodiversity and Ecosystems
Conference Location : Istanbul, Türkiye
Conference Dates : April 19-20, 2016