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Identification and record of insect pollinators on two cultivars of sunflower

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Abstract

Field experiments were conducted in Honey bee Research Institute at National Agriculture Research Center, Islamabad during the year 2012 to record the of insect pollinators on sunflower. Two cultivars of sunflower viz. Hysun-33 and SMH-0942 were sown on 2nd April, 2012. There were open to pollinators respectively. Different species of insect pollinators visiting sunflower were collected and identified at the National Insect Museum, NARC, Islamabad. These species included *Apis mellifera* L, *Apis dorsata* L, *Apis florea*, *Apis cerana*, *Bombus haemorrhoidalis*, *Halictus* sp, *Xylocopa iridipennis*, *Polistes wattii*, *Delta dimidiatripinnae*, *Danis chrysippus*, *Catopsilia circle* and *Eristalinus* sp.

Keywords: Insect, Pollinators, Sunflower, Cultivar, *Apis mellifera*, *Apis dorsata*.

Introduction

Pollinators are essential in seed production for male-sterile (i.e., no pollen producing) sunflowers since pollen must be transferred from male-fertile to male-sterile plants^[1]. Yield of sunflower is extremely dependent on proper pollination which is made by the melliferous bees and other natural insects. The melliferous bees play significant role in assuring pollination of the sunflower crops. Honey bees (*Apis mellifera*), due to higher numbers, rigorous daily activity, as well as their body structure conduct pollen transportation from one sunflower inflorescence to another. This provides an excellent pollination of the tube shaped sunflower florets^[2].

Bumblebee especially *Bombus terrestris* L., have been shipped all over the world in huge numbers^[3] since they were familiar as commercially important pollinators of glasshouse crops in the late 1980s^[4]. Bumble bees prove to be efficient pollinators due to their enhanced fluffy body, their long tongues, and the fact that they can carry out under low temperature and dark conditions. Bumble bees have an economical significance in most wide and cultured plants^[5]. Other insect pollinators such as flies, butterflies and wasps also visit flowers and conduct pollination; however their activities are not considerable. The flowers visited by honeybees per minute were more in open pollination compared to other insect pollinators^[6]. The objective of this study was to record different species of insect pollinators visiting two cultivars of sunflower and their relative abundance.

Materials and Methods

The present field carried out in Honey Bee Research Institute at National Agriculture Research Center Islamabad. The field experiment was conducted during April, 2012. Two cultivars of sunflower viz. Hysun-33 and SMH-0942 were sown in 70m² main plot and sub plots 4m² with in randomized complete block design with three replications. Plant to plant and row to row distance was kept as 30 and 60 cm respectively. A 30 cm path between the plots was maintained. Two cultivars of sunflower (Hysun-33 and SMH-0942) were sown. All recommended cultural practices were done.

Collection of different species of insect pollinator visiting sunflower

The experimental plot was kept free from any spray during flowering period. Observations were made on different pollinators visiting the sunflower field during flowering. All types of pollinators were collected using hand net from sub plot.

Results

Data given in Table 1 shows that a total of twelve species of insect pollinators were visiting both cultivars SMH-0942 and Hysun-33 during spring, 2012 at NARC, Islamabad. Of these, nine species belong to order Hymenoptera, two species belong to order Lepidoptera and one species belongs to order Diptera. Among Hymenoptera *Apis mellifera*, *Apis cerana*, *Apis florea*, *Apis dorsata*, *Bombus* sp., *Xylocopa* species, *Halictus* sp. and two species of wasps (*Polistes* spp.) were observed visiting sunflower. Lepidopterus species included Monarch butterfly (*Danis chrysippus*) and yellow butterfly (*Catopsilia circle*).

Only one dipterous fly, the Syrphid fly (*Eristalinus* sp.) was found on sunflower. Rajasri *et al.*, (2012) also reported that *Apis dorsata*, *Apis mellifera*, *Apis cerana* were the major pollinators of sunflower. Kasina *et al.* (2007) observed *Danaus chrysippus* and *Apis mellifera* on sunflower. Kumar *et al.* (2005) reported similar results. Mahavir (1999) recorded *Polistes* sp., *Vespa orientalis* L. and *Bombus* on sunflower. Abrol (1996) also reported *Bombus haemorrhoidalis*, *Apis cerana*, *Xylocopa* sp., *Halictus* sp., *Syrphus* sp., wasps and butterflies as pollinators of sunflower. According to Chambo *et al.* (2011) these insects visit sunflower for pollen and nectar.

Table 1

Common name of pollinators	Scientific name	Systematic position
European bee	<i>Apis mellifera</i> L	Hymenoptera (Apidae)
Giant Honey bee	<i>Apis dorsata</i> L	Hymenoptera (Apidae)
Small Honey bee	<i>Apis florea</i>	Hymenoptera (Apidae)
Local Honey bee	<i>Apis cerana</i>	Hymenoptera (Apidae)
Bumble bee	<i>Bombus haemorrhoidalis</i>	Hymenoptera (Apidae)
Halictus bee	<i>Halictus</i> sp	Hymenoptera (Apidae)
Carpenter bee	<i>Xylocopa iridipennis</i>	Hymenoptera (Apidae)
Wasp 1	<i>Polistes wattii</i>	Hymenoptera (Vespidae)
Wasp 2	<i>Delta dimidiatripinnae</i>	Hymenoptera (Vespidae)
Monarch butterfly	<i>Danis chrysippus</i>	Lepidoptera (Danidae)
Yellow butterfly	<i>Catopsilia circle</i>	Lepidoptera (Pieridae)
Syrphid fly	<i>Eristalinus</i> sp	Diptera (Syrphidae)

Conclusion and Recommendations

The present research showed that pollinators visit sunflower in great number and put a positive impact on yield and quality of sunflower. The study provided baseline information on the species of pollinators visiting sunflower. Sunflower growers should encourage visits of pollinators to their crop for obtaining high yield. For protection and conservation of pollinators farmers should avoid pesticide spray during flowering season.

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