

FLORAL INVENTORY OF WILD HONEY BEE FORAGE



Zoology

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ABSTRACT

The present study was conducted between July 2014 and June 2015 in Chandigarh region to work out the floral inventory of wild bee plants . This study provides evidence that as many as eleven species viz; Argemone mexicana L , Lantana camara L, Trigonella corniculata, L, Alternanthera sessilis (L), Oxalis debilis Kunth, Trifolium repens L, Ageratum houstonianum, Mill, Calotropis procera (Aiton), Conoclinium coelestinum L, Chenopodium album L and Solanum nigrum L belonging to wild flora of the mentioned area were identified as source of honey bee forage . The objective of this study was to assess whether other flowering plants act as alternative floral resources that may impact on abundance and diversity of flowers.

Introduction

Honey bee live on flowers of plants, shrubs, herbs and trees. The type of vegetation of an area basically depends on its temperature, influence of man and soil. As such beekeeping plays a vital role in conserving the natural resources and contributes to the globe through environmental protection. Honeybees require feed for their production and reproduction. The forage sources for honey bees are an important consideration for beekeepers. Forage is also significant for pollination management with other bee species. Nectar comprises of sugars that are the primary source of energy for the bees' wing muscles and for heat for honey bee colonies for winter. Pollen provides the protein and minerals that are mostly fed to the brood in order to replace bees lost in the normal course of life cycle and colony activity.

As nectar and pollen plants are basic requirements for beekeeping and honey production their knowledge is essential for beekeepers. Bee forage plants may be fruits , vegetables , ornamental plants , crops , medicinal plants , herbs , shrubs, bushes , trees ,forest and weeds (Abrol,1997) and(Kumar and Bharti,2015).The knowledge of foraging behaviour of honeybees and their flora is essential for management of beekeeping (Dalio, 2013) and (Bista and Shivakoti,2001). Bee forage calendar for beekeeping is a period that indicates the approximate date and the duration of the blossoming period of the existing honey or pollen plants in an area .In addition to the time and duration of blossoms of honey plants , it also involves the mapping of density , distribution , and honey potential of the regional bee flora . The bee forage calendar is one of the most useful tool in the sector of the apicultural operations which requires complete observation of the seasonal changes in the floral patterns of an area , the foraging behaviour of the bees , and the manner in which the honeybee colonies interact with their floral surroundings (Atwal ,2001) For successful beekeeping it is desirable to study availability , suitability and identification of such wild bee flora which provide useful forage.

Chandigarh region is suitable for growing various multipurpose flora due to good degree of diversity in climatic conditions and temperature (Kohli ,et.al, 1994). There is diversity of flora in different seasons and honey bees visited these plants for pollen and nectar. Summer is the time for storage surplus food as there is more flora in the field and days are long. They store sufficient honey for the winter. April and May are usually considered to be the period of nectar flow. After honey flow, there comes the hot months of June and July when most of the colonies stop brood rearing in the lower hills and in the plains. December –January

and June-August were identified as the dearth period with low temperature flowering plants and some vegetables show flowering during rainy season. Because of continuous rain and thereby fluctuation in temperature this period also found unfavourable for honeybee foraging (Kumar ,2013). It has been observed even during the course of the studied period with reference to months of March and April .

Materials and Methods

The study included observation of bee `s activities on flowers of different plant species. The present study was carried out from July,2014 to June 2015 thrice a week from 0630 to 1830 Hours in Chandigarh region .Whenever bees were found on the flowers of such plants , their foraging behaviour was observed for a period of 5-10 minutes . Observations were recorded with the help of Sony camera 14.1 Mega Pixels and Nikon Camera with configuration of DX AF-S NIKKOR 18-55mm .Extensive observations were recorded with respect to types of relevant species visited and feeding on wild plants and specific co-relation with respect to bee forage.

Results and Discussion

Based on the availability of different plants along with their flowering time, a bee floral inventory has been developed for Chandigarh region. The knowledge of blooming period is important factor for sustainable management of bee colonies and for good honey harvest (Taha, 2015 and Thakur , 2012) .This inventory is pertaining to the month of flowering and distributed in bee flora. As such a complete sequential record of blooming periods of wild bee flora was made . The floral mapping has facilitated the standardization of beekeeping practices in the case of medicinal bee flora(Kumar, et al.,2015) . As many as eleven different wild plant species under nine families were identified as wild honeybee forage plants (Plate 1 and 2). The detail account of floral inventory of the wild honey bee forage given in Table:1

PLATE-1:WILD BEE FLORA





PLATE-2: WILD BEE FLORA



usually available for a period of two to four months(Figure:1) and as such provides useful bee forage as alternative floral resources.

As many as eleven species of wild flora were studied out of which six are excellent source viz; *Argemone mexicana* L , *Trigonella corniculata*, L, *Oxalis debilis* Kunth, *Trifolium repens* L, *Ageratum houstonianum*, Mill ,*Calotropis procera* (Aiton), ,four are good source viz; *Alternanthera sessilis* (L), *Conoclinium coelestinum* L, *Chenopodium album* L and *Solanum nigrum* L while *Lantana camara* L is average source (Figure:2).

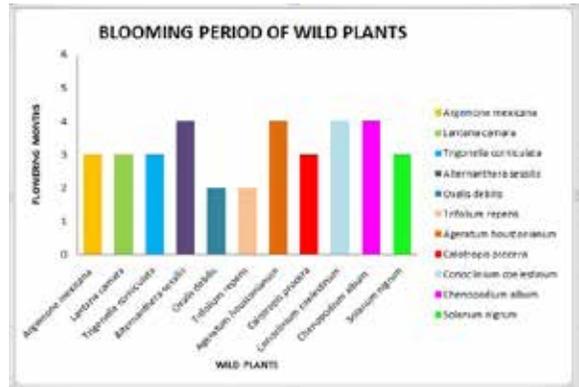


Figure 1: Blooming period of wild bee flora observed from July 2014- June 2015



Figure 2: Studied wild bee flora potential

TABLE 1 : Floral Inventory of Wild Honey Bee Forage

Sr No.	Botanical Name	Common name	Family	Habit	Blooming Period	Source for nectar
1	<i>Argemone mexicana</i> L	Prickly Poppy	Papaveraceae	Herb	March-May	Excellent
2	<i>Lantana camara</i> L	Lantana	Verbenaceae	Shrub	March-May	Average
3	<i>Trigonella corniculata</i> L	Kausri Methi	Fabaceae	Herb	March-May	Excellent
4	<i>Alternanthera sessilis</i> (L)	Sessile Joyweed	Amaranthaceae	Herb	February-April	Good
5	<i>Oxalis debilis</i> Kunth	Pink wood sorrel	Oxalidaceae	Herb	March-April	Excellent
6	<i>Trifolium repens</i> L	White clover	Fabaceae	Herb	March-April	Excellent
7	<i>Ageratum houstonianum</i> Mill	Blue weed	Asteraceae	Herb	January-April	Excellent
8	<i>Calotropis procera</i> (Aiton)	Aak	Asclepiadaceae	Herb	February-April	Excellent
9	<i>Conoclinium coelestinum</i> (L)	Blue Mist-flower	Asteraceae	Herb	January-April	Good
10	<i>Chenopodium album</i> L	Bathua	Chenopodiaceae	Herb	January-April	Good
11	<i>Solanum nigrum</i> L	Makoy	Solanaceae	Herb	February-April	Good

The studied wild bee flora during the present course of work

Conclusions

The present study find out as many as seven wild bee flora with excellent potential of honey bee forage as alternative source in Chandigarh region . The present knowledge of wild bee flora of a Chandigarh region enable beekeepers to utilize them at the maximum level, so that they can harvest a good yield of honey and other bee products in addition to effective pollination, which boosts crop yields. Availability of enough wild bee flora provides sufficient amount of bee forage , which ultimately leads to gradual colony build up .

Recommendations

There is immediate need to conserve wild bee flora and attention must be given to maintain and multiply the available flora. The present findings would be awareness in preparing an inventory of existing bee flora and develop floral calendar for Chandigarh region for future workers in the field of Apiculture tasks .

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