

HONEY BEE PLANT AND ITS PRODUCTION IN TEHSIL TEHKT-E-NASRATHI KARAK

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Abstract

This study investigated various aspects related to honey bee plant, honey production and bee behavior in the District Karak of Pakistan. The district was divided into two zones based on rainfall, temperature, and soil texture: "Tall zone" with hot temperatures and annual rainfall below 500mm, and the "Sabarabad" Zone with rainfall between 500 and 750 mm. Questionnaires and personal interviews were conducted with local honey beekeepers to gather data on soil structure, Sojourning time, plant juice accumulation, honey color, and its production. The study identified several plant species, including *Ziziphus jujube*, *Senegalia modesta*, *Vachellia nilotica*, and *Dalberga sessio*, that played a significant role in honey production. *Ziziphus numularia* (beri) emerged as a common fruit in the region, attracting honey bees. The study reported that honey production was highest in the village council of Sakotii due to its abundant and diverse cultivated flora. However, certain areas like Chokara experienced a decline in honey production due to a decrease in vegetation caused by human activities. The study also explored the foraging behavior of bees. Bees exhibited specific sojourning times, with two main foraging trips during the day, primarily collecting nectar and pollen from various plant species. The bees demonstrated remarkable capabilities, embarking on long-distance journeys of up to 10km in search of sustenance. Moreover, certain plants, such as *Senegalia modesta* and *Ziziphus*, attracted bees from even greater distances. The study highlighted the influence of soil structure on honey production. The western region of Karak displayed optimal conditions with abundant vegetation, including ornamental plants like citrus and guava. In contrast, the eastern region had sparse flora but thrived due to the presence of *Senegalia modesta*, *Rosa indica* and *Sideroxylon mascatense*. However, this region was more susceptible to diseases, posing a threat to bee populations. Bees selectively collected juice from specific plants, with *Ziziphus* nectar being the most potent, followed by *Senegalia modesta*. *Hardium vulgar* and Maize juice were found to be crucial for protecting nascent bees. The study observed that wild bees exhibited greater efficiency in juice accumulation compared to domesticated bees. The study documented notable honey production figures across the seasons. Ahmad Abad, Tatter Khel, and Khojaki Kala reported honey yields ranging from 900 kg to 1000 kg during the *Ziziphus* season. Skilled beekeeping practices resulted in a substantial yield of 400 kg in Shahdeen Banda and 750 kg in Bader Khel. The study emphasized the importance of skilled beekeepers and highlighted that untrained beekeepers and pest infestations could reduce honey production. Overall, this study provides valuable insights into honey production dynamics, bee foraging behavior, soil structure effects, and plant juice accumulation in district Karak. The findings can aid in developing effective strategies for sustainable beekeeping and maximizing honey production in the region.

Keywords: Honey Bee, Plant, Production, soil structure, Sojourning time, Karak

Introduction

The synergistic benefit between honey bee (pollinator) and plant is very seminal for both of them. Many plant species are used by familiarize honey bee, which suggest a high potential for disturbance of native plant pollinator liaison. The liaison between pollinator and plant are collegial. In plant especially, flower benefit by their pollen efficiently distributed to other flower of the same species, allowing them to reproduced. Pollinator benefit by feeding on the nutritious pollen and nectar that flower provided. Honeybee can provide plant with their nitrogen indirectly through their faeces (Mishra *et al.* 2013). Colony size increased with pollen and nectar rich flower strips high quality. Evenly distributed flowers strips and increasing areal proportion increases honey bee colony size. (Scheper *et al.* 2015) study the top of the general effect of changes in flower richness, establishment of flower strips in itself resulted in higher increases in bee densities and richness other than in control field boundaries.

In Pakistan, four species of honey bee are present. The honey bee have the strong affinity honey production and the dispersal of seed and also know for pollination seating and the most important function is their crop pollinator (Khan and Chaudhry, 1998). There are three honey bee species (*Apis floreae*, *Apis dorsata* and *Apis cerana*) as they are the most important crop pollinator which are domestic and are considered as the native species of Pakistan. One (*Apis mellifera*) is migrated from Russia and Australia during 1979 (Noor, 2009). With continued pressure from known driver such as habitat loss and pathogen, coupled with the clear ecological and economic risk associated with pollinator honeybee loss in Europe and North America (Potts *et al.* 2010b). The average winter mortality of honey bee colonies between 2008 and 2017 increases in Europe (Wood *et al.* 2020). Bumble bee frequently sojourn plant in the family Asteraceae (like heath aster or England aster) and Lamiaceae (like garden sage, catmints or lavender), but they rarely collect pollen from these plant. Honey bee are the only species of bee with a barber stinger. The stinger often gets lodged in skin and rips from the bee's abdomen, causing its death. Other species do not have barbed stingers, so the same individual can sting multiple times. The amended caliber and lapful vegetation, fruit and production of standard seed & eminently distort patio crop was the performance of *Apis mellifera* species through pollination in the splendid delving area.

The beer plant (*Ziziphus Jujube*) honey is very important beneficial used from old people like mostly in 1970-1985 era they are used to remedy of someone who is bitted by dog as well now days also. It is also used for to cure the blindness to put some drop in eye. Now days they are mostly used for to increases the erectile dysfunction and also prescribed for those women which have problem of their children. The honey obtained from *Senegalia modesta* which is often used in medicine specially cough syrup, pulmonary tract diseases. In fact not all plant are suitable to honey bee foraging and some plant are toxic, for example, *Astragalus miser* var. *serotinus*. Some other plant (e.g. coriander; *Coriandum sativum*) are less frequently sojourning by honey bee than wild bee as founded by (Bendifallah *et al.* 2013). Therefore, identifying honey bee plant in specific region and their potential benefit to honey bee colonies as sources of pollen, nectar or both is very important for beekeeping especially since not all plant are suitable to honey bee. (Abou-Shaara, 2015).

Study Area Narration

District Karak is situated on the south of Peshawar. It is 123 km from the Peshawar capital of KPK. The latitudes of district Karak are from 70-40' 71 '30' north and their longitudes 32'-48' to 33'-23' from east. This area is mainly separated into two main Zone on the basis of rainfall, temperature and soil texture. Tall zone (Thall area) which is comparatively hot and annual rainfall is less than 500mm. *Ziziphus numularia* (bera), *Senegalia modesta* (palosa), *Ziziphus jujube* (beri),

Triticum aestivum (wheat), *Avena sativa* (barley), *Vachellia nilotica* (kicker), *Dalbergia sessio* (shesham) are commonly found in this region. *Ziziphus numularia* (beri) is the common fruit in this region, which attract honey bee. The temperature reach up to 46-49 c in summer while in winter season it reach up to 19-21 c. The second Zone Sabar Abad. Annual rainfall between 500 to 750mm. the common fruit, wild plant is founded such as *Ziziphus jujuba* (beri), *Senegalia modesta* and peanut (*Arachis hypogea*).

The current study was mainly held on Thall zone specially Tehsil Takhte-e-nasratti (Karak). The current study was based on the questionnaires. The sample are distributed among the honey bee keeper in the study area. Information was gathered through from each site by using a questionnaire and from the local and old era experienced people through personal interview. Questionnaire& personal interview we have mostly related about soil structure, food, plant juice accumulation, color of honey and also some area have more honey production etc. the study was conduct very short fell time on the month of Dec 2022 to April 2023.

Material and Method

Study visited carried on the basis of honeybee plant in Tehsil Takhte-e-Nasratti. During project 50times visited in different area to collect data about honeybee plant and their bee correlation. Almost 75-interview was arranged to obtained knowledge about honeybee plant and honey production with their honeybee keeper, local old experienced people and marketing level honey production people. 350 question was shared with honey bee keeper, 50-60 question shared with old local experienced people and 60 question shared with honey marketing people. 120-worker will take parts during project. Totally 40 old experienced people, 35 honeybee keeper, 15 female and 20 young educated experienced people and 10 children will take parts. (Rafiq *et al.* 2017) prevalence of *Varroa destructor* on honey bees hives in district Karak, Total 308 specimen was collected in different region of the district Karak. Specimens were collected from Takht-e-Nasrati, Chokara, Bogarra, Mianki Bunda, Ahmed Abad, Warana, Latember, and Shah slim. In Tehsil Takhte-e-Nasratti every village council visited 2- time with worker during project. Maximum data about honeybee plant & honey production are same during visiting. Except from 75-interview also arranged 10-interview to collect data about soil structure, price and color of honey. So, we gathered data about honeybee plant, honey production, soil structure and color of honey.

Results

Table 1. Honey Bee referenced flora in Tehsil Takht-e-Nasrati Karak

Scientific name	Local name	Family	Habit	Flowering time	Benefit to bee
<i>Calotropis procera</i> (Aiton) W.T.Aiton	Spelmaka	Apocynaceae	Shrub	May end	Pollen
<i>Rhazya stricta</i> Decne.	Gandari	Apocynaceae	Shrub	Sep-Dec	pollen
<i>Phoenix dactylifera</i> L.	Khajora	Arecaceae	Tree	Spring	pollen
<i>Asphodelus tenuifolius</i> Cav.	Phezky	Asphodelaceae	Herb	Dec –Mar	Pollen
<i>Brassica rapa</i> L.	Shesham	Brassicaceae	Herb	Dec-Jan	pollen
<i>Capparis decidua</i> (Forssk.) Edgew.	Kairra	Capparaceae	Tree	Aug-Sep	Pollen
<i>Albizia lebbeck</i> (L.) Benth.	Sreen	Fabaceae	Tree	April-May	Pollen
<i>Dalbergia sissoo</i> Roxb. ex DC.	Shesham	Fabaceae	Tree		Pollen
<i>Senegalia modesta</i> (Wall.) P.J.H.Hurter	Palosa	Fabaceae	Tree	Mar-April	Nectar
<i>Vachellia nilotica</i> (L.) P.J.H.Hurter&Mabb.	Kiker	Fabaceae	Tree	April –May	pollen
<i>Abelmoschus esculentus</i> (L.) Moench	Okra	Malvaceae	Herb	Spring	nectar
<i>Morus alba</i> L.	Tooth	Moraceae	Tree	Mar-April	Pollen
<i>Psidium guajava</i> L.	Imrod	Myrtaceae	Tree	Spring/summer	pollen
<i>Peganum harmala</i> L.	Sponda	Nitrariaceae	Herb	Spring	Nectar /pollen
<i>Hordeum vulgare</i>	Bajra	Poaceae	Herb	Summer	Pollen
<i>Ziziphus jujuba</i> Mill.	Bera	Rhamnaceae	Tree	Spring and summer end	Nectar
<i>Ziziphus nummularia</i> (Burm.f.) Wight & Arn.	Bera	Rhamnaceae	Tree	Spring	Nectar
<i>Ziziphus oxyphylla</i> Edgew.	Mutabera	Rhamnaceae	Tree	Spring	Nectar
<i>Rosa indica</i> Jacq.	Sadagulab	Rosaceae	Shrub	Throughout year	Pollen
<i>Citrus × limon</i> (L.) Osbeck	Nemboo	Rutaceae	Tree	Spring	Nectar
<i>Sideroxylon mascatense</i> (A.DC.) T.D.Penn.	Gurgara	Sapotaceae	Tree	Mar-April	Pollen

Table 2. Honey production in different Village Council Tehsil Tahk-e-Nasrati Karak

S. No	Village Councils	Honey production by small types bee per colony	Per season	Honey production by large types bee per colony	Per season
1.	Tatter Khel	1.2 kg	20-22 kg	2.5-3.5 kg	55-60 kg
2.	Khojaka Kala	1.3 kg	24-28 kg	3-3.5 kg	65 kg
3.	Warana Mosakan	1.4-1.5 kg	29-30 kg	4 kg	70-75 kg
4.	Ahmad Abad	1.7 kg	35 kg	4 kg	68-70 kg
5.	Saikto	1.6 kg	35-40 kg	3.5 kg	80 kg
6.	Chokara	1 kg	26-28 kg	2.5-3.5 kg	55-60 kg
7.	Karee Dand	0.7 kg	7-9 kg	1 kg	15-20 kg
8.	Zarki	0.8 kg	15 kg	2 kg	45-50 kg

Table 3. Color of Honey Based on Plants.

Botanical Name	Family	Color	Taste
<i>Ziziphus nummularia</i> (Burm.f.) Wight & Arn	Rhamnaceae	Red	Sweet
<i>Senegalia modesta</i> (Wall.) P.J.H.Hurter	Fabaceae	Yellow/white	Bitter sweet
<i>Eucalyptus camaldulensis</i>	Myrtaceae	Mixed color	Sweet
<i>Rhazya stricta</i>	Apocynaceae	Green color	Sweet

Table 4. Price on the basis of bee

Bee types	Market value Pakistan (Rs)
Small bee	5000-5700 Rs per kg
Large bee	3000-4000 Rs per kg
Mixed large and small bee	1800-2500 Rs per kg

Table 5. On the basis of plant price

Plant name	Market value Pakistan (Rs)
<i>Ziziphus jujube</i>	5000-5700 Rs per kg
<i>Senegalia modesta</i>	700-1000 Rs per kg
<i>Rhazya stricta</i>	3000-3400 Rs per kg

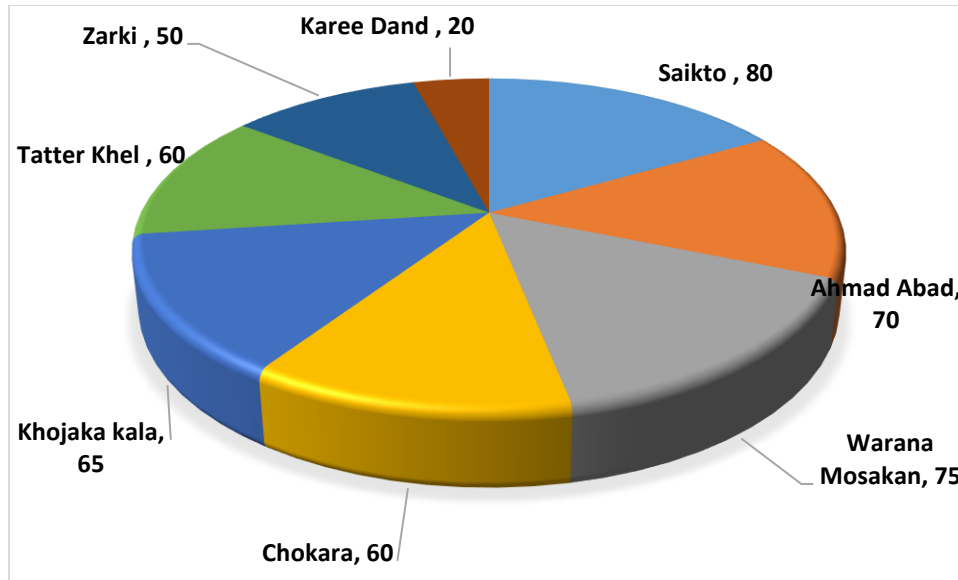


Fig. 1. Production/year by small bees



Fig. 2. Production/year by large bees

Discussion

Honey bee is one of the most important cordial insect which crop-up allosteric behavior in his life form. But inhabit in the enclave confess as protectorate collation of individual in which drone (murmuring), worker (hireling), and queen (monarch) are ramified. The entrants execute a gossip piece of work (chore/task) inside the colony activity. A miscellaneous queen is an imperative and most member of protectorate. The whole time research one of the village council Sakotii have achieved highest production inside their season because of their, some ecological issue, huge amount of rainfall and environmental pollution which were not complementary to the bee rearing and flora contain cultivated plant like Limon, citrus garden which achieved highest

marked other village council. Such village council have containing every penchant flora in their season .The village council Warana and Ahmad Abad also their suitable condition for vegetation like *Ziziphus* spp, *Rhiza stricta*, *Pegnum harmala* and also they have market shop on middle of both village council which make the bee for attracting their production for honey. Village council Tatter Khel are also suitable for their bee habitat for their unique vegetation both summer and winter season. In summer season they have wide vegetation of *Ziziphus* spp, *Asphodelus tenuifolius* and *Calatropis procera* which make special from other village council. And also they contain like cultivated plant *Abelmoschus esculentus*, Barley, Limon etc. they are present. In winter season they have a wide area of cultivated plant like Brassica rapa and Delbergia sessio which make the suitable habitat for bee and also honeybee keeper. Mostly the large types of honey bees is sojourn in their season. One of the village council Chokara, once upon have achieved their more honey contribution but now day it have not maintain because of their some activity like mostly honeybee keeper sojourn toward such area. In village council Chokara having also their pleasant flora like *Rosa indica*, *Vitis vinifera*, *Ziziphu* spp., *Senegalia modesta* etc. with their also their one of large market shop in near area within 2 km. According of one interviewer the one plant of lower side (east) Indus highway have produced honey is equal to the 10 plant of Chokara. Village council Khojkee is also unique for bee buzzing in their for honey production, juice accumulation and their soil ability, such village have ornamental plant like Citrus garden, Gavava garden and also their other types of vegetation like *Pegnum harmala*, *Asphodelus tenuifolius* etc. are present. Now days the tree, shrub types vegetation which is used by honeybee have been cutted in village council Zarkii , some year ago it produced more honey production as compare to now day because when you see it one eye from few year they have homemade plant now day it is demolished almost. Village council Karee Dand is one of village council which have lots of problem form the district made, like water problem, soil structure and also no vegetation about 10 year ago, but with the passage of time inside 2013-2017 people planted their tree shrub which are suitable for honeybee. Now day again it is cute which are used for fuel, wood. Due to water problem honeybee keeper is not visited and also flora is not a unique. Depletion of honey plants will directly affect the number of honeybee colonies, causing their respective decline, which will lead to the downfall of agriculture and economy of the area. Artificial pollination is unimaginable and is practically very difficult. Therefore, honey plants which are essential pollen sources must be protected and conserved well (Krishna and Patil 2019). Over all the whole side of Takht-e-Nasratti of upper area which also some traces of *Sideroxylon mascatense* and cultivated *Olea* spp. The current study was carry out in Karak Tall site for the purposes of sojourning time, propinquity, ginger accumulation, soil structure ,diseases causes from plant body and also honey production in different site of Tehsil Takht-e-Nasrati Karak.

Sojourning Time

The sojourning time of bee contra of plant is conventional. During the summer, the bee engages first visit in nectar collection prior to 5or 6oclock.they predominantly gather nectar from flowers and occasionally from *Ziziphus* and *Senegalia modesta*. (Alqarni, 2015) domenstrated that both native *Apis mellifera*, *jemenitica Ruttner* and the exotic *Apis mellifracarnica* Pollmann foraged on *Ziziphus nummularia* flowers. Bee foraging for nectar and pollen was low (2+0.7 worker / 200 flowers /3 min) during early morning and increased to peak in the afternoon (100 +worker /200 flowers / 3 min). Remarkable foraging activity was recorded during high temperature (35 c) and low humidity (20%) condition. Forager bee learn the odor of nectar and pollen on their first flight and use this to re-find their feeding place on their next flight In the absence of alternative forage, most bees seem to be able to relocate a site after 3 days. 80% of the

bee revisited the feeder 3 days after training.(Beekman, 2005).Bee makes a second visit between 9to11oclock during the day, especially for the purposes of collecting nectar & pollen from various plant such as *Ziziphus*, *Calatropis procera*, Okra, Citrus spp. and *Rhazya stricta*. Wild bee do not visit after 4O clock to the numerous obstacle they encounter while returning to their hives. Certain bees embark on early morning expedition to procure nectar or succulent juice from diverse flora, traversing great distance in their pursuit. Their triumphant return to the hive typically after a span of approximately two days, sowing to the considerable ground they cover.

Amidst the winter season, notable within the temporal window of 9 to 10 o'clock, these bee embark upon their forging venture with utmost precision. Their discerning focus lies upon extracting the nectar or essence from the plentiful brassica plant, have been cultivated expansively within the designated locale. If nectar resources are scarce, bee are going to find it increasingly hard to locate suitable foraging patches and their chances of successfully returning to the colony are likely to drop especially on cold spring or fall day when metabolic demands are the highest and they are already stressed by the effect of a pathogenic infection (Naug, 2009). After 12.00 am in winter season honey bee visiting for juice accumulation, it is last visit for honeybee. There will be no visit after that because of their some issue such as problem of distance, encountering of someone etc. Furthermore, we assumed that forage availability is either constantly high or low, nectar and pollen are replenished to their given values at the end of each day (Franziska *et al.* 2014). According to (Han and Biesmeijer, 1998) for food sources communication is tis known for long time that foraging honey bees provide information to other bee in the hives about the location of the food sources they have visited through waggle dance.

Propinquity

Predominantly bee traverse a notable expense of 3to 4kilometer in their quest for nectar or ambrosial elixirs. The fascinating subset of bee enticed by the allure of *Senegalia modesta* gracefully navigate distance of approximately 3km. astonishingly , diligent observation have documented their counter parts embarking on remarkable journey spanning up to an astonishing 5 km when irresistibly drawn toward the enticing *Ziziphus* flora. Bee returning from a flight to collect nectar or pollen from the field not only provide information about the location and type of the sources but also increases their ability to find the feeding area by teaching the flower clues such as shape, color, and odor. The odors used recognizing flowers are easily learned by bee and play an important role in recognizing food sources, especially at close range After a patch of flowers has been found that provides enough food, the individual bee sticks to a particular kind of flower within a patches and may of travel kilometers visiting up to hundreds of flowers during one foraging bout (Menzel and Muller, 1996). In the annual of 2013, an intriguing account emerged from the village of Bader-Khel, where it was duly recorded that the diligent bee embarked on audacious odysseys, spanning an impressive span of 8 to 9 km, driven by an unyielding pursuit of nectar or succulent essences. The terrain within this vicinity was chief dominated by the resolute *Sideroxylon mascatense* and alluring *Ziziphus* flora, as the neighboring environs endured the upheaval and devastation wrought by relentless hailstorm, which wreaked have upon crop . Furthermore, with scarce resources, the foraging distance increases (Beekman & Ratnieks, 2000). However, (Becher *et al.* 2014) considered it essential to explicitly represent environmental factors driving colony dynamic sand to link within-hive dynamics and foraging by representing the seasonally dynamic storage, consumption, demand and collection of nectar and pollen. Including this level of complexity ensures that links and feedback mechanisms between reproduction, brood, food stores and foragers can be successfully captured.

Subsequently, in the year 2017, the village of Qamar-kali bore witness to a similar phenomenon, as nature's tempestuous fury unleashed fierce hill storms accompanied by torrential downpours, decimating the verdant tapestry of flora. In the wake of such calamity, the resolute bees demonstrated unwavering fortitude, traversing extraordinary distance of 9 to 10 km, diligently gathering nectar or sap from the venerable *Senegalia modesta*. Furthermore, throughout the border research terrain, it was discerned that the diligent would typically journey up to 3km, displaying an innate tenacity and undeterred determination in their quest for sustenance. According to (Buhk *et al.* 2018), Butterflies were only recorded qualitatively as presence/absence data between 9 am and 4 pm at a maximum distance of 5 m along a line of about 250 m (transect sampling) within the selected structures.

Juice Accumulation

Principally, the industrious bees amass nectar or sap from an assortment of botanical specimens, including *Zizpus*, *Senegalia modesta*, and during the summer season, they likewise extract from *Herodium vulgar*, Maize, *Calatropis procera*, commonly Acacia, as well as an array of ornamental plant such as Citrus. Most flowering plant in Egypt depend on pollinators and in case of pollinators losing on annual cost of about 2.4 billion dollar was estimated (Brading *et al.*, 2009). There is main honey flow in Egypt; citrus in spring (Hussein, 2001). Delving into the realm of juice quality assessment, it become evident that the potency of *Zizpus* nectar reigns supreme, surpassing its counterparts in intensity. The preference of nectar and pollen sources of honeybees may differ according to plant species (Dietz, 1992). To positive effects of the implementation of a flower strip network on local abundance and diversity of bees and Butterflies increase with the time since establishment. This situation can also vary depending on the proximity, quantity, quality and variety of the nectar and pollen sources (Cengiz, 2018) Following closely in its wake, the acacia variety manifests a commendable strength in its extracted essence. Additionally, the bees demonstrated a discerning preference for *Pegnum harmala*, *Calatropis procera*, *Tenefolius Albizia lebbeck*, *Morus alba* and *Sideroxylon mascatense* embarking on extensively journey to procure these prized substances from afar.

In their discerning pursuit of nectar or sap, the bee exhibit a remarkable discernment for selecting specific species. Notably, the juice derived from *Hardium vulgar* and Maize holds a vital purpose in safeguarding the nascent bees. The largest amount were collected in summer followed by winter then spring, while least ones were in autumn. Correlation was highly positive between weekly mean of pollen weights and maximum temperature, while it was insignificant for minimum temperature or relative humidity. There were 24 plant species of botanical families from which bees collected pollen. (Ismail *et al.* 2013). The bees judiciously utilize *Clatrpais procera* solely for its juice, indicating a distinctive preference for this botanical specimen. Remarkably, it is observed that wild bee exhibit greater celerity in accumulating juice compared to their counterparts. Pertaining to *Senegalia modesta*, certain respondents have attested to its juice being endowed with a denser viscosity, distinguishing it from the nectar of *Ziziphus*. In nature, the pollen, nectar, leaves, and the root of plants emit their own unique odors.

Soil Structure

The village of Thall exhibits a mixed soil structure or composition, reflecting a diverse amalgamation of earth constituents. Geographically, the area is demarcated into distinct east and west division, each bearing unique characteristic. The western region emerge as a verdant oasis, abundantly adorned with a profusion of diverse flora, with the notable exception of the relatively scarce *Senegalia modesta*, furthermore, this expanse boasts optimal water availability, fostering an environment conducive to thriving vegetation and reducing the likelihood of afflictions. The

nectars found within this locale exude remarkable potency, while an assortment of ornamental plants such as citrus and guava grace the surrounding.

In contrast eastern territory reveals a sparse flora, yet it remarkably thrives in the presence of resolute *Senegalia modesta*, *Rosa indica* with some trace of *Sideroxylon mascatense* and *Olea* spp. which tower above the landscape. The botanical landscape here exhibits a fusion of diverse species, although it is plagued by a heightened susceptibility to diseases, posing a considerable threat to the bees. Nevertheless, despite these challenges, the bees demonstrate their resolute tenacity by venturing into this realm to gather nectar and pollen. However, the western soil composition emerge as the preferred choice for establishing hives and facilitating honey production, owing to its more favorable attributes.

Honey production

The magnitude of honey production hinges upon the diligent effort of individual possessing profound expertise in the field, and also they skilled and practiced beekeeper are required. A remarkable illustration of this phenomena is evident in the account from Shahdeen Banda, where an impressive deployment of 80 meticulously crafted boxes during the *Senegalia modesta* season engendered a substantial yield of 400 kg of honey. This remarkable achievement can be attributed to the presence of skilled individual, adept at overseeing the process with meticulous attention, ensuring optimal condition and the absences of any detrimental diseases that could compromised the honey production. According to (Crane and Walker 2000) garden have always been a preferred place for keeping hives of bees, and the paper quotes description of this practice written in England from the sixteenth century. In wet and windy regions, some beekeeper built special structures in stones, brick or cob to provide extra protection for the straw skeps used. If there is any unskilled keeper there would be honey production will ceased, like (Kinati *et al.* 2012) also noticed that decrease in honey production in Ethiopia is due to the untrained beekeeper and high load of pest and parasites.

During the *Ziziphus* season, an impressive honey production range of 900 to 1000 kg was meticulously documented in the village of Ahmad Abad, Tatter Khel and Khojaki Kala. Notably, this abundant yield emanated from diligent bee, which were thoughtfully nurtured and housed within specially designed box-like enclosure, resembling cohesive and structured form. (Hikmat *et al.* 2016) observed highest number of honey production per colony in Hassan Banda, Ghoor Zandi and Terawal Banda it may be possible due to ecological issue and causes high temperature, moisture in air environmental pollution and a huge amount of rainfall which were not complementary to the bee rearing, their developmental stages and also influences the efficiency of honey.

According to responded account, a staggering quantity of approximately 30,000kg of honey was meticulously documented as the collective yield across the season within the single year. This bountiful production emanated from the fruitful endeavors diligent collecting nectar from the distinguished *Ziziphus* and *Senegalia modesta* plant. In the year 2022, an enterprising initiative unfolded in the vicinity of Bader Khel Karak, wherein total of 140 meticulously crafted box were strategically deployed. Each of these boxes comprised a remarkable assembly of 7-chamber, serving as conducive habitats for the industrious bees. Astoundingly, the fruit of this concerted effort yielded a substantial honey production of approximately 750kg, as reported by the respondent. Furthermore, within the same locale, the untamed bees, known for their resolute independence, contributed to the honey production landscape. Specifically, in the year 2022, these interpreted creature amassed a modest yet noteworthy quantity of approximately 3kg of honey, garnered exclusively from the revered *Ziziphus* plant.

An appropriate study documented by (Shah, 2002) Bangladesh that reported 30-40kg of honey per colony was manufactured on the annual base. Although, the amount of honey in Bangladesh is greater than the production of Nepal but the excellence of honey is inferior as compared to honey of other of other region of the world. In some species, the amount of nectar TSS per flower was high, but the amount of honey per tree or hectare of land low because honey production potential also depend on the number of flowers per unit area or volume and the canopy of the plant. Furthermore depending upon on the estimated number per plant hectare of land, and also assuming that 18% of honey is water, a minimum of 14.49 kg and a maximum of 829 kg honey /hectare were estimated to be obtained from *O. fruticose* and *Z. spina-Christi*, respectively. With the optimal plant densities of the Acacia species, the expected amount of honey per hectare of Acacia forestland was estimated at a maximum of 624.5 kg for Acacia johnwoodi and a minimum of 51.1 kg for Acacia etbaic (Nuruadgaba *et al.* 2017) .In Pakistan, the valley of Chitral produced 1332kg of honey taken out from single house hold bee hives in Kalash valley per annum. From the whole amount of honey, 130kg were produced from the various types of vegetation nectar of Chitral. With the similar situation Chitral tree plant consist of the most increased size in length and wild flowering trees. The ecological change of the area also show positive and proper amount of honey production. The restricted beekeepers extract honey from the hives, by means of local and modern method of extraction. Using these techniques in honey collection the productivity rate is decreasing every day due to depletion and reduction. The honeybee loss may occur due to certain factors. In Chitral, local acquired rate of honey collected from 400-500 per kg during 2005. Partly of the total honey was purchased in the native market of Chitral while left over honey delivered in the nationalized and intercontinental market. (Harper, 2010).

Diseases

There is no such types of specific diseases is caused to bee from plant. Although it is some uncertainty which include like, During winter season bee have mostly visited toward *Brassica campestris*, at the stage life is newly born days flora of Brassica sp. is not completely turn down into juice accumulation .but it just have like juice (bore) types, when bee collect this pollen they will tried after one days or two days and also within weak death caused. There is one another factorial news collect from honeybee keeper and also from old experience people , bee during the Aug- Sep they visited toward *Capparis Deciduo*a there pollen raised. After they collect pollen from plant which contain one/two venomous pollen in hundred or one half hundred pollen which caused death of bee within one or two days.

Conclusion

The district of Karak boasts a highly conducive vegetative milieu is rich with suitable plant for honey bee& as well as sources of pollen, nectar or some time both. The availability of these plant with season for honey bee is used with opportunity for honey production. For honey production in district Karak there is also important role of environmental condition. Any environmental calamity or disruption will invariably reverberate through the flora, consequently exerting a direct and adverse impact on honey production.

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