WORLD BEE PROJECT

Survey on the Practices on Bee Rearing to Understand the Correlation of forage resources with the production of queen bee of *Apis cerena.*

Submitted by:

Institute of Natural Resources

Shillong- 793001

Content

WORLD BEE PROJECT

A. Abstract:

Information from the Bee keepers

Each and every keeper has a different method of separating the queen bee from the old hives and transferred it to the new home/hive. Some do manually by taking the queen bee (at the third stage of instar) out of the hive into another box and also taking ½ or ¼ of the worker bees from the original hive into the new home while some waited till the nascent queen is fully matured and collect the new hive when the new queen itself leaves the hive. Each keeper have different method for separating the nascent queen from the old hive; those who used the Khadi boxes, they take out the compartment with the nascent queen (at the third stage of instar) and put the compartment into new box; While one of the bee keepers used a plastic vile to collect the queen and kept it in the new box. After doing the questionnaires researched, the bee keepers clearly mentioned that the production of the queen bee cannot be artificially induced.

B. **Methodology:**

Collection of baseline data from different bee keepers of different villages through questionnaires

C.: District-wise observation:

1. **West Khasi Hills**
    - Block : Mairang
    - Village: Sylleibah
    - Agro climatic zone: Sub tropical

1.1: Plant species

a. Trees: *Bauhenia variegata, Shorearobusta* (Sal), *Prunuspersica* (Peach), *Macaranga sp., Artocarpus heterophyllus* (Jackfruit), *Phyllanthus emblica* (Amla), *Magnifera indica* (Mango), *Psidium guajava* (Guava), *Carica papaya* (Papaya), *Schima wallichi* (Diengngan), *Bombaxceiba, Daubungagrandiflora(*Diengbai), *Eleagnuslatifolia, Michelia champaca* (Diengrai), *Rhus succedanea* (Diengkain), *Litchi chinensis*(Litchi), *Musa sp.*(Banana).

b. Herbs: *Eupatorium adenophorum* (Kynbat Japan), *Ageratum conyzoides* (Kynbatblu), *Hedychium* sp., *Zingiber* sp.,

c. Bee species: *Apis cerana.*

2. East Khasi Hills
- Block : Mawlai
- Village: Mawsiatkhnam
- Agro climatic zone: Sub tropical

2.2: Plant Species

a. Trees: *Betulaalnoides, Mangifera indica, Artocarpusheterophyllus, Psidium guajava, Erythrina stricta, Dysoxylum hamiltonii, Citrus sp., Zanthoxylumsp., Carica papaya, Pyrus sp., Wendlandiawallichii, Prunuspersica, Euryaaccuminata, Taxicondendron sp., Bombaxceiba, Leucosceptrumcanum, Musa sp.*,

b. Shrub: *Osbeckia* sp., *Hibiscus* sp., *Lantana camara, Solanum sp., Chromolaena odorata.*

c. Herb: *Ageratum conyzoides,Bidenspilosa, Galinsugaparviflora, Eupatorium adenophorum*

d. Bee species: *Apis cerana*

3. West Jaintia Hills
- Block : Laskein
- Village: Mooshrot
- Agro climatic zone: Sub tropical

3.1: Plant Species

a. Trees: *Prunus sp., Callistemon citrinus, Mangifera sp., Arthrocarpus heterophyllus, Citrus maxima, Psidium guajava, Michelia champaca, Morus alba, Bauhinia purpurea, Bauhinia variegata, Chaerospondias pinnata, Erythrina sp., Musa sp., Bombax ceiba, Lagerstroemia sp., Citrus sinensis, Litseacubeba, Macaranga sp., Prunus nepalensis, Prunus persica, Betula alnoides,Schima wallichii,Quercus serrata, Pinuskesiya, Myrica sp.,Elaecarpus sp.*

b. Shrubs: *Chromolaena odorata, Ricinus communis, Solanum sp, Euphorbia sp., Hisbiscus, Zanthoxylum sp., Melastoma* sp.

c. Herbs: *Eupatorium riparium, Eupatorium adenophorum, Dichrocephala integrifolia.*

4. East Khasi Hills
- Block :Shela Bholaganj
- Village: Laitduh
- Agro climatic zone: Sub tropical

4.1: Plant species

a. Trees: *Syzygium sp., Phoebe sp., Castanopsis sp., Cameliacaduca, Pandanus sp., Euryaaccuminata, Quercus sp.,*

b. Shrub: *Rubus trifolia, Osbeckia sp., Agapetes sp., Thysanolaena maxima.*

c. Bee species: *Apis cerana*

5. East Jaintia Hills
- Block :Khliehriat
- Village: Wapung
- Agro climatic zone: Sub tropical

5.1: Plant Species

a. Trees: *Exbucklandia populnea, Citrus maxima,Zanthoxylum sp., Psidium guajava,Robus trifolia, Podocarpus nerifolius, Canarium sp., Eurya accuminata,Caffea sp. Rhussp.,Chaerospondia spinnata ,Erythrinasp.,Ligustrum robustum,Rhus succedanea,Pinus kesiya,Myrica esculanta,Prunus nepalensis,Morus alba,Leucosceptrum canum, Pyrus Sp.*

b. Shrub: *Hibiscus chinensis, Baugainvillea glabara ,Elaeagnus latifolia, Solanum betaceum.*

c. Herb: *Zea mays, Raphanus sativus, Brassica campestris, Bidens pilosa, Ageratum conyzoides, Sonchus sp.*

d. Bee species: *Apis cerana.*

6. East Khasi Hills
- Block :Shela Bholaganj
- Village: Nongpriang
- Agro climatic zone: Sub tropical

6.1: Plant Species

a. Trees: Mostly dominated by species of Bamboo species. However other species are also found viz., *Ligustrum robustum, Eurya accuminta, Ficus sp., Schima wallichii, Syzygium tetragonum, Caryotaurens, Macaranga sp., Itea macrophylla, Artocarpusheterophyllus, Ficushirta, Micromelum integerrimum, Litsea cubeba, Litsea sp., Chaeropondias pinnata, Wendlandia wallichi, Castsnopsis sp., Mangifera indica, Areca catechu, Dalbergia sp., Cinnamomum tamala, Citrus sinensis, Baccaurea sp., Morus alba, Bauhinia sp., Daubanga grandiflora, Rhus chinensis, Syzygium cumini, Toona ciliata.*

b. Shrub: *Hibiscus chinensis, Melastoma sp., Daphne sp., Thysanolaena maxima, Pandanusodoratissimum, Breynia* sp, *Cinnamomum bejolghota, Boehemeria sp., Caffea species, Clerodendrum viscosum, Chromolaena odorata, Dracaena angustifolia.*

c. Herb: *Eupatorium riparium, Kalanchoe pinnata, Ageratum conyzoides, Didymocarpus sp., Lilium sp., Disporum sp., Aeschynanthes sp., Dendrobuium aphyllum, D. ochreatum, D. chrysanthum, Pholidotaimbricata, Coelogyne spp., Hoya spp.* And many fern species.

d. Bee species: *Apis cerana*

A. Bee hive

B. Compartments of Khadi

C. Honey comb of old hive

D. Types of bee Boxes

A. Traditionally made from a tree trunk

B. Cemented box

C. Khadi box

E. Detailed Findings:

The questionnaires used for the following survey has been aimed to set the context of the importance on the health of bees and their interaction with the environment which are coherently affected by anthropogenic activities as apiculture deems to be a lucrative option for uplifting the livelihood but it could have an adverse effect in relation to the sustainability of bee population and colony health. The questionnaires of 22 questions would elucidate five key points as follows:

1. Bee Keepers and their knowledge on apiculture. (Section 1)

2. Artificial insemination for the production of nascent queen bee. (Section 2)

3. Honey production per colony annually. (Section 3)

4. New technology adopted for colony propagation and honey extraction. (Section 4)

5. Availability of forage resources (environment) on Bee population (Section 5)

Table- 1 Bee Keepers and their knowledge on apiculture.

Sl. No.	District	Block	Village	Very Good (10)	Good (8)	Moderate (6)	Fair (4)	Poor (2)
1.	WKH	Mairang	Sylleibah	-	8	-	-	-
2.	EKH	Shella	Nongpriang	-	-	-	4	-
		Bholaganj	Laitduh	-	-	-	4	-
		Mawlai	Mawsiatkhnam	-	8	-	-	-
3.	WJH	Laskein	Mooshrot	10	-	-	-	-
4.	EJH	Khliehriat	Wapung Skur	10	-	-	-	-

Table- 2- Artificial induction for the production of nascent queen bee. Possibility?

Sl. No.	District	Block	Village	Yes (10)	No (5)
1.	WKH	Mairang	Sylleibah	-	5
2.	EKH	Shella	Nongpriang	-	5
		Bholaganj	Laitduh	-	5
		Mawlai	Mawsiatkhnam	-	5
3.	WJH	Laskein	Mooshrot	-	5
4.	EJH	Khliehriat	Wapung Skur	-	5

Table 3. Honey production per colony annually.

Sl. No.	District	Block	Village	Very Good (8-10Kg) (10)	Good (5-7Kg) (8)	Moderate (3-4Kg) (6)	Fair (1-2Kg) (4)	Poor (0.1-0.9Kg) (2)
1.	WKH	Mairang	Sylleibah	-	-	-	4	-
2.	EKH	Shella	Nongpriang	-	-	-	4	-
		Bholaganj	Laitduh	-	-	6	-	-
		Mawlai	Mawsiatkhnam	-	-	6	-	
3.	WJH	Laskein	Mooshrot	-	8	-	-	-
4.	EJH	Khliehriat	Wapung Skur	-	8	-	-	-

Table 4. New technology adopted for colony propagation and honey extraction

Sl. No.	District	Block	Village	Yes (10)	No (5)
1.	WKH	Mairang	Sylleibah	-	5
2.	EKH	Shella	Nongpriang	-	5
		Bholaganj	Laitduh	-	5

		Mawlai	Mawsiatkhnam	-	5
3.	WJH	Laskein	Mooshrot	-	5
4.	EJH	Khliehriat	Wapung Skur	10	-

Table 5. Availability of forage resources (environment) on Bee population

Sl. No.	District	Block	Village	Very Good* (10)	Good* (8)	Moderate* (6)	Fair* (4)	Poor* (2)
1.	WKH	Mairang	Sylleibah	-	-	-	-	2
2.	EKH	Shella	Nongpriang	-	8	-	-	-
		Bholaganj	Laitduh	-	-	-	4	-
		Mawlai	Mawsiatkhnam	-	-	6	-	
3.	WJH	Laskein	Mooshrot	-	-	-	4	-
4.	EJH	Khliehriat	Wapung Skur	-	-	-	4	-

Note: *

- Very Good: Abundant natural forage resources.
- Good: Semi- agricultural and natural forage resources.
- Moderate: Large Patches of trees/herbs/shrubs of foliage cover at 45% of total area (Ha.)
- Fair: Small patches of trees/herbs/shrubs of foliage cover at 25% of total area (Ha.)
- Poor: Deforestation and patches of trees/herbs/shrubs of foliage cover at 5% of total area (Ha.)
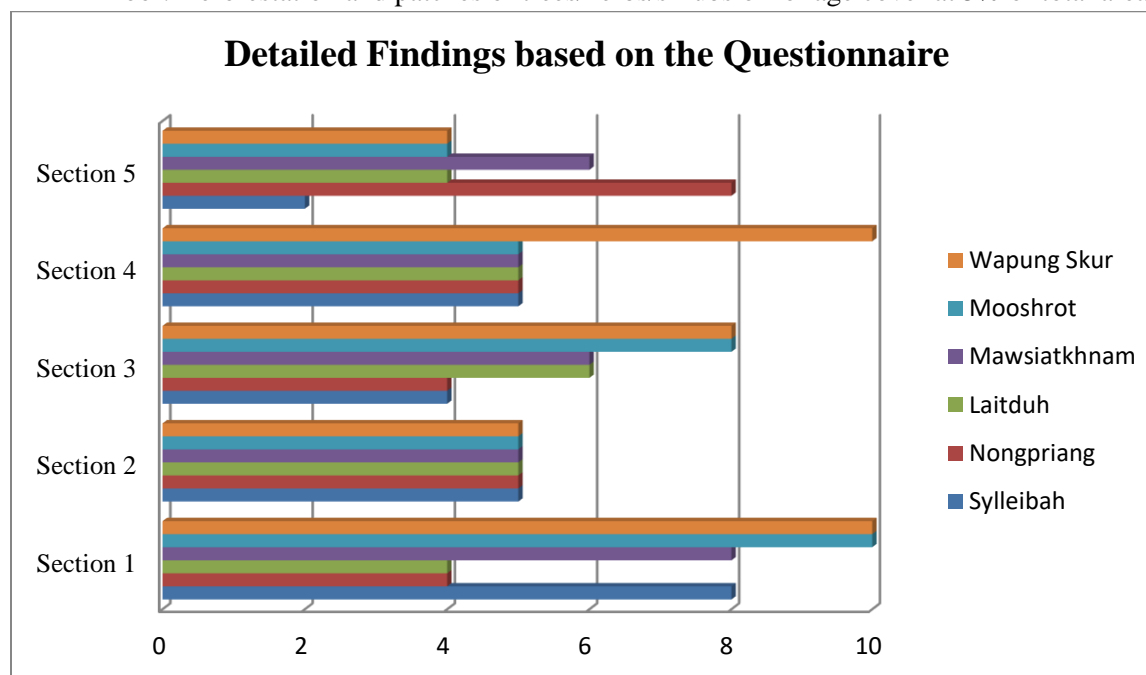

Detailed Findings based on the Questionnaire

Table.6. Bar diagram of the above parameters depicting Section 2 is uniform in the area of study and only

the bee keepers of Wapung Skur has adopted new technology such as honey extractor, plastic vial for separation of nascent queen bee to a new colony to be introduced in new box.

F. Conclusion:

Several recent syntheses of the effects of anthropogenic disturbance on native pollinators report negative impacts of isolation from natural habitat on the abundance and species richness of native bees. Those studies and others post that the loss of floral resources is one driver of bee declines. Exceptions to the general pattern of habitat loss and native-bee declines also appear consistent with an effect of resource availability. The abundance of flowers in the landscape surrounding a colony significantly affected the combined number of workers and males it produced. Colonies at sites with greater total resources produced more workers and males over the course of the season.

The likelihood that the abundance of resources did not showed direct correlation to the production of queen bee. Queen production showed differences in autumn season in East Khasi Hills of the Shella Bholaganj Block vs. spring season in the above districts viz. West Jaintia Hills, East Jaintia Hills and West Khasi Hills.

G. Prospect Work (Abstract):

We will combine a well-resolved landscape classification with field surveys of flower abundance and flower use by *Apis cerena* to quantify the flower resources available in the landscape. Using *Apis cerena* colonies placed throughout the landscape, we would test the following hypotheses about how floral resources in the landscape affect bumble bee colony growth and reproduction.

(1) floral resource abundance in the landscape will be positively correlated with the amount of natural or seminatural habitat such that resource abundance might help to explain previously documented effects of landscape composition on bee populations and communities;

(2) the numbers of worker, male and queen offspring produced will depend on the floral resource abundance in the landscape.

3) resource abundance varies temporally through the season, and production of workers and queens will be more sensitive to resource availability early in the season when the number of foragers in a colony is lower.

The local bee keepers would be involved in the proposed work for setting of 2 colonies at 25 sites (sites will span a gradient that varied proportion in natural habitat) with a spatial independence of 2.5 Km apart from one colony in the study sites that would highlight natural, seminatural, agricultural and riparian habitats along with season temporal as queen production as the proxy for observation to be measured