

Diversity and Abundance of Beetles in Lakhimpur, Assam India

Jashodeb Arjun, Karina Tamuli, Kaushik Boruah, Nikita Borah, Joyshree Saikia Rajdeep Nath and Rajesh Paul

Department of Zoology, Silapathar Science College (P.G.), Assam
Science Technology University, Silapathar, Assam, India

ABSTRACT

This investigation is a short term assessment which is attempted to explore the diversity of beetles in Lakhimpur, Assam as the region is extensively familiar for its biodiversity enrichment. Lakhimpur, a district of Assam receives tropical wet evergreen forest and lies in northern bank of river Brahmaputra. The district is adobe to many valuable flora and fauna. Triggerred by our inquisitiveness, we planned an experiment and collected beetle samples from 4 distinct areas as paddy land, vegetable, garden and forest areas. Beetles were collected twice a day from 6.30-11am during morning and 3-5 pm during evening. Several approved collection techniques like Light trap, Pitfall trap, hand picking were applied. Beetles were then brought to the laboratory and stored in 4% formaldehyde in sterilised small glass vials. Identification was done followed by standard identification manuals. Remarkably, 25 species of beetles belonging to 13 different families have been identified in Lakhimpur as May beetle, *Derobrachus geminates*, Oriental beetle, Aphodine dung beetle, *Heteronychus arator*, *Gonocephalum simplex*, *Chrysochus cobaltinus*, *Compsosternus auratus*, *Gyrinus substriatus* and others. Weather parameters like temperature, relative humidity, rainfall may have influence over beetle abundance in Lakhimpur. Our beyond expectation findings clearly indicated that Lakhimpur, like other parts of Assam is heavily blessed with different varieties of insects

KEY WORDS: BEETLES, WEEVILS, INSECTS DIVERSITY, LAKHIMPUR, ASSAM.

INTRODUCTION

Beetles are contemplated as the largest among all insects making up around 30% of all the insect species described so far (Abou-Shaara et al, 2021). They extensively come under the order 'Coleoptera'. The word is derived from Greek word 'keleos' meaning 'sheathed wing' (Branco and Cardoso, 2020). Around 3,50,000 species of beetles have been identified universally (Gullan and Cranston, 2010). Sighted in all kinds of habitats like soil, dead plants, logs, dung, etc. Beetles have been described to feed on fungi, plants and animal matter. Beetles exhibit many interesting features like they are endopterygotes (undergoing complete metamorphosis); traps air bubbles for diving purpose (water beetle); chemical defense for protection (Tenebrionidae), parasitism (*Platypyllus castoris*) (Das et al, 2016). From anatomical point of view beetles resembles to other class of insects excluding the elytra, which is formed by hardening of frontal pair of wings. They reveal many adaptations like camouflage (Chrysomelidae), mimicry (Cerambycidae),

aposematism, chemical defense (Tenebrionidae), parasitism (Castor sp.), pollination (Cantharidae), mutualism (ambrosia beetle), tolerance to extreme environment (*Stenocara gracilipes*), migration (Coccinellids), etc. Although some appear as serious agricultural pests and damage crops where as many beetles are proved helpful like ladybeetle acts as a predator against Colorado potato beetle in crop fields. Ground beetles feed on cutworms, caterpillars, snails, slugs and other soil dwelling insects. rove beetles takes shelter beneath stones or wooden blocks acts as good decomposers.

Lakhimpur, a district of Upper Assam is an administrative district of Assam. The district is bordered by Arunachal Pradesh, Majuli, Biswanath, Siang, etc. and by Subansiri river from all around. It covers a total area of 2,277 km² approx. The district is about 85m above sea level. Lakhimpur is geographically subdivided into 3 regions as- Narayanpur-Bihpuria, Dhakuakhana and North Lakhimpur. Biodiversity is enriched with tropical wet evergreen forest. Some popular forest reserves of Assam like Ranga Reserve, Dulung Reserve, Kakoi Reserve and Bardoibum-Beelmukh Wildlife Sanctuary are located in Lakhimpur and marks the biodiversity enrichment of this part of Assam.

Article Information: *Corresponding Author: jashodeb@gmail.com

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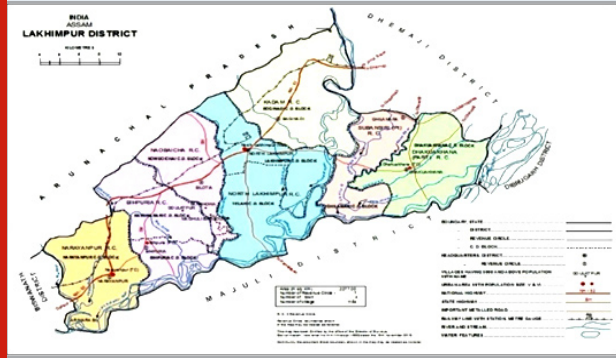
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Lakhimpur (Location, Constitution and Area) :- The rural area of Narayanpur is located about 7.2km from Tatibahar station, Lakhimpur, which comes under Bihpuria constituency. Our assessment was conducted specifically in various parts of Narayanpur.

Longitude - 94.20/ Latitude - 27.53/
 Average rainfall -1227mm approx. Humidity- 57%-63%.
 Temperature - 9°C to 24°C during summer.

Figure 1: Geographical location of Lakhimpur



MATERIAL AND METHODS

Collection and assemblage of beetles were carried out randomly from four different sites. Beetle sampling was initiated with the onset of pre-monsoon season as this season marks the peak time for beetle emergence (Bhattacharyya et al, 2015; Pathania M, and Chandel RS , 2016) and continued for 3 consecutive months from March to May, 2022 . Beetles were spotted twice on daily basis from 6.30am-11am during morning and 3pm-5pm during evening. Hand picking and insect catching nets were preferred. Collected beetles were killed by vapour of killing agents and brought to the laboratory with delicacy and later stored in 4% formaldehyde. Spotting was brought about based on physiological characteristics followed by the protocol of (Neog and Rajkhowa , 2016).

To monitor the abundance of beetles Light Trap method was also applied followed by the protocol of Reissing et al, 1986. Materials used for making Light Trap included bamboo/wooden poles, string/rope, kerosine lamp/electric blub and basin full of water/ jute sack. Light trap was installed in the target areas to trap beetles. The poles of the trap were firmly set on the ground and the bulb was mounted on the trap frame which was 5mtrs from the ground. To avoid electrocution , proper care was taken while using electric bulb. Next the jute sack was carefully set under the light chamber. The device was left overnight for 3 consecutive months and trapped insects were collected during morning hours. Another effective and proved technique known as ‘Pitfall trap’ was also applied to encounter the abundance of beetles in Lakhimpur (Gist &Crossley, 1973). There are two of its kind as ‘dry pitfall trap’ and ‘wet pitfall trap’. We preferred wet pitfall trap where big wholes were made in

the ground and filled with 4% formaldehyde so that insects fall over there and can be trapped easily.

Community structure analysis: Diversity of beetles were analysed using Shannon-Weiner Diversity Index (H). It is a renowned metric system used in ecological analysis. The index value rises with number of species and evenness of abundance. The more is diversity of species in habitat, the higher will be the index.

Figure 2: Relative abundance beetles recorded in Lakhimpur from March to May, 2022.

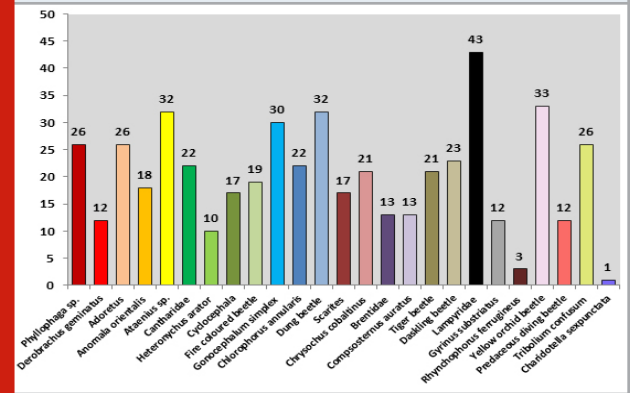
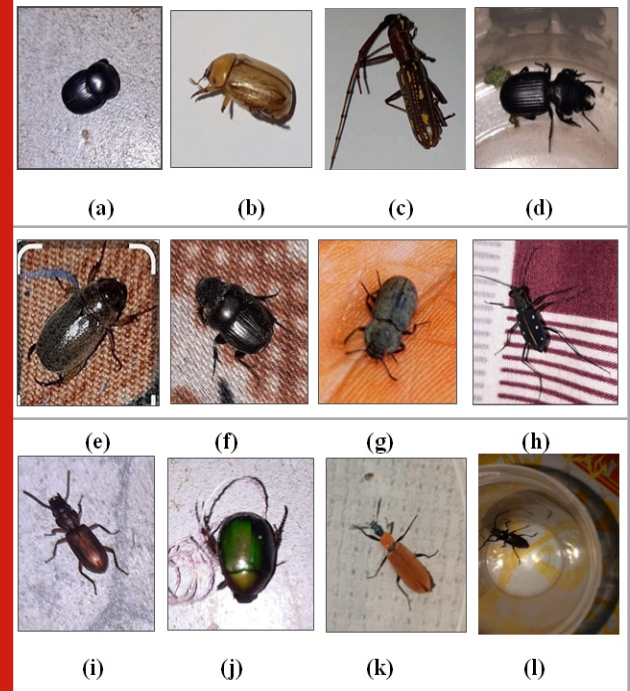


Figure 3: Pictures of some spotted beetles- (a) Ataenius sp,(b) Cyclocephala,(c) Brentidae, (d) Scarites, (e) Phyllophaga sp, (f) Heteronychus arator, (g) Gonocephalum simplex (l) Darkling beetle, (h) Tiger beetle, (j) Oriental beetle, (k) Fire coloured beetle, (l) Derobrachus geminatus



Shannon-Weiner Diversity Index (H)=-∑[pi *log(pi)]

Where,
 H= Shannon Diversity Index; pi=Proportion of individuals

of i-th species in a community; $p_i = n/N$,

Where,

n =Individuals of a given species and N =Total number of individuals of a community.

RESULTS AND DISCUSSION

More than 500 beetles were captured from March to May, 2022. A total of 25 species of beetles belonging to 13 different families were spotted. Scarabaeidae family beetles took lead followed by Chrysomelidae and Cerambycidae. Among the dominant species were *Lampyridae* (Firefly) (8.53%); Yellow orchid beetle(6.54%); *Ataenius* sp. (Aphodine dung

beetle), Dung beetle (6.34%); *Gonocephalum simplex* (Dusty brown beetle) (5.95%); *Phyllophaga* sp.(May Beetles), *Adoretus*, *Tribolium confusum* (Confused flour beetle) (5.15%). Whereas Darkling beetle (4.56%); Cantharidae (Soldier beetle), *Chlorophorus annularis* (4.36%); *Chrysochus cobaltinus* (blue milk weed beetle), Tiger beetle (4.16%); Fire coloured beetle (3.76%); *Anomala orientalis* (Oriental beetle) (3.57%); *Cyclocephala*, *Scarites* (ground beetle)(3.37%); *Brentidae* (straight snouted weevils) , *Compsosternus auratus* (2.57%); *Derobrachus geminatus*, *Gyrinus substriatus*, Predaceous diving beetle (2.38%) showed noticable gathering. Only Heteronychus arator (African black beetle)(1.98%); *Rhynchophorus ferrugineus* (Red plan weevil) (0.59%); *Charidotella sexpunctata* (0.19%) turned up in less or very less quantity.

Table 1: Beetles spotted in Lakhimpur from March to May, 2022.

SL NO.	NAME OF SPECIES	SCIENTIFIC CLASSIFICATION						
		KINGDOM	PHYLUM	CLASS	ORDER	FAMILY	GENUS	SPECIES
1	<i>Phyllophaga</i> sp.(May beetles)	Animalia	Arthropoda	Insecta	Coleoptera	Scarabaeidae	<i>Phyllophaga</i>	--
2	<i>Derobrachus geminatus</i>	Animalia	Arthropoda	Insecta	Coleoptera	Cerambycidae	<i>Derobrachus</i>	<i>geminatus</i>
3	<i>Adoretus</i>	Animalia	Arthropoda	Insecta	Coleoptera	Scarabaeidae	<i>Adoretus</i>	--
4	<i>Anomala orientalis</i> (Oriental beetle)	Animalia	Arthropoda	Insecta	Coleoptera	Scarabaeidae	<i>Anomala</i>	<i>orientalis</i>
5	<i>Ataenius</i> sp. (Aphodine dung beetle)	Animalia	Arthropoda	Insecta	Coleoptera	Scarabaeidae	<i>Ataenius</i>	--
6	Cantharidae (Soldier beetle)	Animalia	Arthropoda	Insecta	Coleoptera	Cantharidae	Cantharidae	--
7	<i>Heteronychus arator</i> (African black beetle)	Animalia	Arthropoda	Insecta	Coleoptera	Scarabaeidae	<i>Heteronychus</i>	<i>arator</i>
8	<i>Cyclocephala</i>	Animalia	Arthropoda	Insecta	Coleoptera	Scarabaeidae	<i>Cyclocephala</i>	--
9	Fire coloured beetle	Animalia	Arthropoda	Insecta	Coleoptera	Pyrochroidae	--	--
10	<i>Gonocephalum simplex</i> (Dusty brown beetle)	Animalia	Arthropoda	Insecta	Coleoptera	Tenebrioninae	<i>Gonocephalum</i>	<i>simplex</i>
11	<i>Chlorophorus annularis</i>	Animalia	Arthropoda	Insecta	Coleoptera	Cerambycidae	<i>Chlorophorus</i>	<i>annularis</i>
12	Dung beetle	Animalia	Arthropoda	Insecta	Coleoptera	Scarabaeidae	--	--
13	Scarites (ground beetle)	Animalia	Arthropoda	Insecta	Coleoptera	Carabidae	Scarites	--
14	<i>Chrysochus cobaltinus</i> (blue milk weed beetle)	Animalia	Arthropoda	Insecta	Coleoptera	Chrysomelidae	<i>Chrysochus</i>	<i>cobaltinus</i>
15	<i>Brentidae</i> (straight snouted weevils)	Animalia	Arthropoda	Insecta	Coleoptera	Brentidae	<i>Brentidae</i>	--
16	<i>Compsosternus auratus</i>	Animalia	Arthropoda	Insecta	Coleoptera	Elateridae	<i>Compsosternus</i>	<i>auratus</i>
17	Tiger beetle	Animalia	Arthropoda	Insecta	Coleoptera	Carabidae	--	--
18	Darkling beetle	Animalia	Arthropoda	Insecta	Coleoptera	Tenebrionidae	<i>Stenocara</i>	<i>gracilipes</i>
19	<i>Lampyridae</i> (Firefly)	Animalia	Arthropoda	Insecta	Coleoptera	Lampyridae	<i>Lampyridae</i>	--
20	<i>Gyrinus substriatus</i>	Animalia	Arthropoda	Insecta	Coleoptera	Gyrinidae	<i>Gyrinus</i>	--
21	<i>Rhynchophorus ferrugineus</i> (Red plan weevil)	Animalia	Arthropoda	Insecta	Coleoptera	Curculionidae	<i>Rhynchophorus</i>	<i>ferrugineus</i>
22	Yellow orchid beetle	Animalia	Arthropoda	Insecta	Coleoptera	Chrysomelidae	--	--
23	Predaceous diving beetle	Animalia	Arthropoda	Insecta	Coleoptera	Dytiscidae	--	--
24	<i>Tribolium confusum</i> (Confused flour beetle)	Animalia	Arthropoda	Insecta	Coleoptera	Tenebrionidae	<i>Tribolium</i>	<i>confusum</i>
25	<i>Charidotella sexpunctata</i>	Animalia	Arthropoda	Insecta	Coleoptera	Chrysomelidae	<i>Charidotella</i>	<i>sexpunctata</i>

Lampyridae, the light emitting firefly belonging to Suborder Polyphaga and Superfamily Elateroidea administered as most dominant which might be due to its preference of temperate and tropical climatic conditions. Fire flies have been reported to disappear day by day due to excessive use of pesticides, fungicides, human traffic, light pollution and many more (Patole, 2019). Dung beetle has good role in agriculture, improving soil fertility, seed dispersal,

protection of livestock, etc. But in our study their dominance indicated proper management of ecosystem by the people of Assam which is a good remark as fire flies are human friendly (Latha and Sabu, 2018). *Ataenius* sp. and Yellow orchid beetles are considered as harmful for damaging crops and flowering plants, hence their huge presence might be seriously noted (Sruthi and Roopavathy, 2021).

Table 2. Comparative analysis of physiological features about beetles detected in Lakhimpur

SL NO.	NAME OF SPECIES	SPECIAL FEATURES	BODY STRUCTURE	COLOUR	HOST PLANTS	ECONOMIC IMPORTANCE
1	<i>Phyllophaga</i> sp. (May Beetles)	Nocturnal	12-35 mm	Blackish/reddish brown.	Turf grass, ornamental christmas trees. Cranberries and certain vegetables and field crops.	Injury to roots and rootstock causes small sapling and tender tap rooted plants.
2	<i>Derobrachus geminatus</i>	Have collar of spines on thorax. They fly at dusk.	3-3.5/4 inches. Sometimes 6-8 inches.	Black/brown	Paloverde trees, rose and olive plants.	Helps in pollination.
3	<i>Adoretus</i>	It is a small elongated oval beetle	10-12 mm	Brown covered with numerous white creamy setae	Lichu, rice, etc.	They damage wide variety of agricultural crops and several other plants.
4	<i>Anomala orientalis</i> (Oriental beetle)	Adults are weak fliers. Overwintering occurs in the final instars.	Body length 0.7-11 cm or 8-13 cm. Shape oval.	Metallic brown and black coloured elytra.	Daisies, roses, hollyhock, phlox and petunias.	Causing damage to horticultural species such as Dahlia sp., corn, crossberry.
5	<i>Ataenius</i> sp. (Aphodine dung beetle)	Male dung beetle have distinct horns, shows symbiotic relationship with mites.	1.5-4.5 cm in length.	Brown/black/bright metallic green in colour	This species breeds and feeds on the dung of carnivores. Eat mushrooms, carrion and decaying leaves and fruits.	They help in maintaining nutrient cycle. They present population of parasitic flies from breeding in the fresh faeces.
6	<i>Cantharidae</i> (Soldier beetle)	Also known as catherwings because of their soft elytra.	5-10 mm (0.2-0.6 inches)	Brown and black and trimmed like a soldiers uniform with red, yellow and orange.	Roses and other flowers. Goldenred.	Soldiers beetles are important pollinators.
7	<i>Heteronychus arator</i> (African black beetle)	Antennae 10 segmented, with a 3 segmented club.	12-15 mm long.	Shiny black oval shaped beetle (black to dark reddish brown)	Crop plants, garden flowers trees and shrubs.	Damage turf and under ground crops notably potato tubers.
8	<i>Cyclocephala</i>	Usually attracted to lights	11-14 mm long; 6-7 mm wide	Dull yellow brown with dark markings on head and legs	Plants roots and other matter near the soft surface	Damage crop lands.
9	Fire coloured beetle	They have 2 luminiscent spots at the posterior corners of the pronotum.	4-20 mm	Orange/red in color.	Feeds on pollen, nectar, fungus and rooting wood.	Not harmful in nature.
10	<i>Gonocephalum simplex</i> (Dusty brown beetle)	They may become cannibalistic if too crowded.	1.5 inches	Dusty brown in colour	Feeds on coffee and rice	Pest of a wide range of crops and poor plant stands. eg. cereals.
11	<i>Chlorophorus annularis</i>	Mostly found in bamboo forest.	0.6 inches (15 mm) long and 0.2 (5 mm) wide.	Yellow with black tiger like markings.	Bamboo, cotton, sugar cane	It is a serious and damaging pest of bamboo.
12	Dung beetle	Dung beetles are known to bring ecological balance and economic advantage to environment.	5-30 mm	Brown/black in colour.	Dung beetles eat liquid from animal dung.	Beetles are important for the breakdown and recycling of dung into the soil.
13	Scarites (ground beetle)	Found mostly in terrestrial habitat	25-35 mm long	Attractive purple/multicoloured dark brown to black	Fungi, decaying wood	Act as biological control agents in agro ecosystem.
14	<i>Chrysochus cobaltinus</i> (blue milk weed beetle)	It rarely has an exposing pygidium.	6.9 mm (0.24-0.35 inches) in length.	Blue in colour.	Feeds on foliage and flowers of newly developed plants.	Pest for many plants, causes damage to plants.
15	<i>Brentidae</i> (straight snouted weevils)	They are identified by their distinctive long	0.5-50 mm long	Dark in colour with orange markings in	Fungi, seeds, dead wood	Damages and kills crops

Table 2 Continue

		snouts and antennae .		wings		
16	<i>Composternus auratus</i>	Slender body	Approx 4.5 cm in length	Metallic green	Nector, pollen grains, sometimes soft insects like aphids	Helps to avoid predation.
17	Tiger beetle	Have large bulging eyes, long slender legs and large curve mandible.	10-20 mm long (2/5-4/5 inches) long	Uniform black in colour, greyish brown to black with white spots	Feeds upon spiders	Considered as indicators of healthy environmental conditions.
18	Darkling beetle	Only identifiable with lens/microscope	1-1.5 cm		Feeds on dead plants , fungal material, seeing flying around in gardens and woodland areas.	They can be vectors of diseases and source of several diseases like acute leucosis. They are served as bird food known as mealurosms.
19	<i>Lampyridae</i> (Firefly)	In firefly bioluminescence organs are found	5-25 mm	Vivid yellowish orange, gree, yellowish green	Soft bodies insects that live on ground like snails, slung worms, etc.	Fireflies contribute to the food web stability, playing important role as both predators and prey
20	<i>Gyrinus substriatus</i> (whirligig beetle)	It is an aquatic beetle, swims underwater. Boat shaped.	6mm (0.24 inches) long and 4.5 mm (0.18 inches) wide.	Black in colour with a metallic shine	Whirligig beetles feed by capturing and eating dead/decaying plants.	This beetle will scavenge on decaying plant material and detritus in fresh bodies of water.
21	<i>Rhynchophorus ferrugineus</i> (Red plan weevil)	Weevil larva can excavate holes in trunks of palm trees. Adult insect is an excellent flier	35 mm long and 10 mm wide and are characterised by a long curved rostrum	They have brown head and white body , dark spots are visible on the upperside of the middle part of the body.	They mostly feed on red plam, date and coconut	It is an invasive pest that causes severe economic loss in plam plant cultivation.
21	<i>Rhynchophorus ferrugineus</i> (Red plan weevil)	Weevil larva can excavate holes in trunks of palm trees. Adult insect is an excellent flier	35 mm long and 10 mm wide and are characterised by a long curved rostrum	They have brown head and white body , dark spots are visible on the upperside of the middle part of the body.	They mostly feed on red plam, date and coconut	It is an invasive pest that causes severe economic loss in plam plant cultivation.
22	Yelloworchid beetle	Mostly found near waterfalls	They have well developed legs, wings and antennae	Striking yellow body with black eyes	Orchid plant	They destroy flowers, mostly orchids.
23	Predaceous diving beetle	Larva are called 'water tigers'. These beetles prefer quiet at the edges of ponds and streams, floating gently among weeds.	Larva are elongated ,flattened and can be 2 inches long.	Shiny black, brown to dive beetles, sometimes with yellowish marks.	Fierce predators, they donot hesitate to attack prey larger than themselves, including small fish, tadpoles and frogs.	Predaceous diving beetles are common and important members of freshwater ecosystem.
24	<i>Tribolium confusum</i> (Confused flour beetle)	Distinctive antenna with 4 segments which gradually thickens towards the tip; shape of thorax is also special.	3-6mm (1/8-1/4 inch) in length	Reddish brown in colour	Found in infested grains, feeding on broken grains and other food items like rice, dried fruits.	Considered as common model organism in science.
25	<i>Charidotella sexpunctata</i>	Their crystal margins are expanded and nearly transparent.	Adult measures 5-7mm in length.	Color varies from reddish brown with black spots to brilliant, mirror like gold	Consumes foliage of plants, sweet potato, morning glory	Common garden pests

Table 3. Result of Shannon-Weiner Diversity Index

SL NO.	SPECIES	$\pi * \ln(\pi)$	H
1.	<i>Phyllophaga</i> sp.	-0.065	1.235 rounded off to 1.2
2	<i>Derobrachus geminatus</i>	-0.033	
3	<i>Adoretus</i>	-0.065	
4	<i>Anomala orientalis</i>	-0.045	
5	<i>Ataenius</i> sp.	-0.073	
6	<i>Cantharidae</i>	-0.055	
7	<i>Heteronychus arator</i>	-0.020	
8	<i>Cyclocephala</i>	-0.045	
9	Fire coloured beetle	-0.045	
10	<i>Gonocephalum simplex</i>	-0.065	
11	<i>Chlorophorus annularis</i>	-0.055	
12	Dung beetle	-0.073	
13	Scarites	-0.045	
14	<i>Chrysochus cobaltinus</i>	-0.055	
15	<i>Brentidae</i>	-0.033	
16	<i>Compsosternus auratus</i>	-0.033	
17	<i>Tiger beetle</i>	-0.055	
18	<i>Darkling beetle</i>	-0.055	
19	<i>Lampyridae</i>	-0.087	
20	<i>Gyrinus substriatus</i>	-0.033	
21	<i>Rhynchophorus ferrugineus</i>	-0.026	
22	Yellow orchid beetle	-0.073	
23	Predaceous diving beetle	-0.033	
24	<i>Tribolium confusum</i>	-0.065	
25	<i>Charidotella sexpunctata</i>	-0.003	

G. simplex also known as Dusty brown beetle, acts as soil dwelling beetle greatly contribute to agroecosystem including predation, decomposition, etc. Though Darkling beetles are good source of food for birds, lizards, rodents, spiders, etc. but they cause immense harm to poultry by transmitting diseases among flocks, decreasing growth and productivity. Cantharidae (Soldier beetle) are abundant visitors of firmland & known as important biocontrols prior to their contribution in agriculture, pollination, etc. As the name signifies, they feed on eggs and larva of insects which are injurious to crops. They secrete noxious chemicals in 'self defence' (Gupta et al., 2020).

For multiple reasons tiger beetle are beneficial as they feed upon pests including ants, caterpillars, spiders, etc. *Chrysochus cobaltinus* though are harmful to host plants as they consume new leaves and flowers in bulk when attack in groups (Kaud and Sharma, 2017). *Tribolium confusum* attacks stored grains where their dead bodies, fecal pellets causes pungent smell resulting in rejection of grains (Kalawate, 2019).

Predaceous diving beetle, most common among other aquatic beetles, is known as 'water tiger', feeds on aquatic insects,

tadpoles and sometimes beetles of its own kind (Morgan, 1992). They can be best collected by light trapping method at night where as can be easily collected in freshwater zones in day time. Apart from the rest of beetles captured, *Charidotella sexpunctata* was the least abundant during our survey. Weather parameters like temperature, rainfall, humidity, moisture might have positively influenced the abundance of beetles and other insect pests in Lakhimpur (Yumamura et al., 2006).

Insects are poikilothermic animals. Researches have proved that weather factors like temperature, relative humidity, rain fall, etc. remarkably influences the abundance, intensity, distribution, feeding behaviour of beetles and most of the insects in any area (Sima and Srivastava, 2012). Temperature interferes in the metabolic activities of insects and leads to increase their larval and pupal growth (Montgomery et al., 2020). Insects grow best in between temperature range of 15-38 °C Rainfall also affects insect dynamics. In researches it has been reported that insect seasonality is related to rainy season as in rainy season there is abundance of food resources which gives high peak to population (Smith et al., 2017). Results of Shannon-Weiner Diversity Index with index value (H=1.2) correlated with beetle abundance in Lakhimpur.

CONCLUSION

Scarabaeidae family under order coleoptera is the largest and most abundant family of insects. Maintaining resemblance with our previous successful attempt to explore the insect diversity in Silapathar district, this attempt also surprised us. 25 species of beetles were spotted during our short term initiative with limited resources. The diverse climatic conditions of Assam as well as Lakhimpur have huge contribution in enriching the diversity of beetles as well as other organisms in this very area. We are enthusiastic that long term surveys will explore more about beetles of Assam like their roles in ecosystem, feeding habits, life cycle, adaptations, predations, etc.

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