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ANALYSIS

Insecta flora and their behavior on “the walking mango tree”

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ABSTRACT

As a rule, insects do not spend the whole world of their life in just one part (niche) of their habitat, since the places where they develop, reproduce and where the imago finds its food are usually different. Only a few groups of insects occupy the same niche in their habitat for the whole of their life. Insect often mate far away from the places where their developmental stages occur. The imagos meet in certain specific localities where they adapt and reproduce further. In the present study we have encountered a sum of a 1499 insects which includes large group of *Limacodidae sp*. adapted onto this tree along with leaf gall midge, *Whiteflies*, *Anastatus sp*., *Jumping spider*, *Lacewing eggs* and India’s rarest ladybird beetle *Afidentula minima,* which has the capability to depend upon microscopic fungi as a food source. The presence of a huge insecta flora is mainly due to the absence of *Oecophylla longinoda* (red ants) on the walking mango tree. Hence we have observed how these species have adapted onto this tree and their unique behavior for the survival.

Keywords: Niche, Stages, Adapted, Rarest and Survival.

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1. INTRODUCTION

More than three- quarters of the known living species of animals are insects. Nearly a million species have been named throughout the world. The name insect means 'in sections', the body being in three parts: the head, thorax and abdomen. On the thorax are three pairs of jointed legs. Some relatives of insects, which are not true insects but often confused with them, are spiders, centipedes and woodlice. They have similar jointed legs but usually more than three pairs.

Niche
A shallow recess, especially one in a wall to display a statue or other ornament.

Moult
Shed old feathers, hair, or skin to make way for a new growth.

Insect skins cannot stretch much and so growth occurs when an insect sheds or moults it old skin, to reveal a new skin underneath which stretches while it is still soft. In this way growth is not uniform, but takes place in distinct steps. At the final moult a winged adult will appear. Thus insects have a life cycle which involves several stages.

Walking mango tree (Plate 1), a unique mango variety and one of its kinds in the entire world is located at Sanjan, Gujarat, India, *Latitude:* **20.202281** ° north of the Equator, *Longitude:* **72.803437** ° east of the Prime Meridian, *Altitude:* **11.6** meters above sea level. The branches naturally anchor onto the soil and a new sapling emerges out of it and the old part of the tree decays. By this mode on action, the tree is moving its position from one place to another. Hence the name 'the walking mango tree'. So the present study deals with the identification of the insecta flora and their behavior towards the survival upon the walking mango tree.

2. MATERIALS AND METHODS

Source: The walking mango tree

Area of observation: leaf, bark, stem and branches.

Materials used: Sony cybershot camera, Magnifying lenses, brush, forceps, 70% alcohol.

The insects and its eggs were collected and kept in a box for observation and some were stored in 70% alcohol for preservation. Later these were taken for identification at national bureau of agricultural important insects (NBAII), Bengaluru.

Reason behind using 70% ethanol

Why only 70% & why is it not 100% or 50% ethanol? Alcohol is usually not used for killing and fixing vertebrates, but is used for most arthropods. Insects, crustaceans and arachnids can be simply dropped into 70% alcohol for immediately preservation. Note that the color of a specimen is lost almost immediately once immersed in alcohol. Alcohol usually comes in the 95% concentrated form. For long-term preservation, it is usually diluted with water to 70-75% strength. This is the lowest concentration at which preservation will be maintained. During field collections, ensure that solution used is not diluted by the water which comes with the samples. It works by denaturing their proteins and dissolving their lipids. The water in the ethanol solution is the portion that actually does the denaturing. Using higher concentration makes the ethanol less effective because there cells cannot be denatured by the water. Lower concentrations do not allow the ethanol to be as effective because it cannot break down the all lipids or allow the water to get into the cells. The other reasons are more on the use side of things. Firstly higher concentrations of ethanol evaporate very quickly. Concentrations like 95% or 90% may evaporate before than can come in contact with most of the microbial life.

Warning: Alcohol is usually safe to handle, but can cause irritation to the skin in cases of prolonged contact. Always rinse hands thoroughly with water after working with alcohol. Industrial alcohol is toxic and should never be drunk. Receptacles containing alcohol should always be properly and clearly labeled. Alcohol is highly flammable. Never work with this fluid in the vicinity of open flames. Alcohol is prone to rapid evaporation, and receptacles holding it should be securely covered at all times, and not be opened unnecessarily.

3. RESULTS

The results have been represented in the form of graphs, plates and tables. The graphical representation (Graph 1) signifies the sum of insect population of the walking mango tree. The plates (Plates 1-14) resemble the evidences of their existence and the table 1 gives the total number of species present.

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Plate 1: The walking mango tree

Plate 2: Limacodidae sp. eggs

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Plate 3: Limacodidae sp. eggs

Plate 4: Limacodidae sp. eggs

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Plate 5: Leaf gall midge

Plate 6: Whiteflies

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Plate 7: Anastatus sp. (Wasp)

Plate 8: Affidentula minima (Ladybird beetle)

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Plate 9: Limacodidae eggs from normal mango tree (brown) and walking mango tree (White)

Plate 10: Spiders web inside Limacodidae egg shell

Plate 11: Jumping spider eggs found inside Limacodidae egg shell

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Plate 12: Jumping spider

Plate 13: Moth scales found inside Limacodidae egg shell

Plate 14: Lacewing eggs

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Table 1
Total number of species

Specie Name	No.
Lacewing eggs	55
Leaf gall midge	60
Jumping spider	71
White fly	80
Anastatus sp.	330
Afidentula minima	402
Limacodidae	501
Total	**1499**

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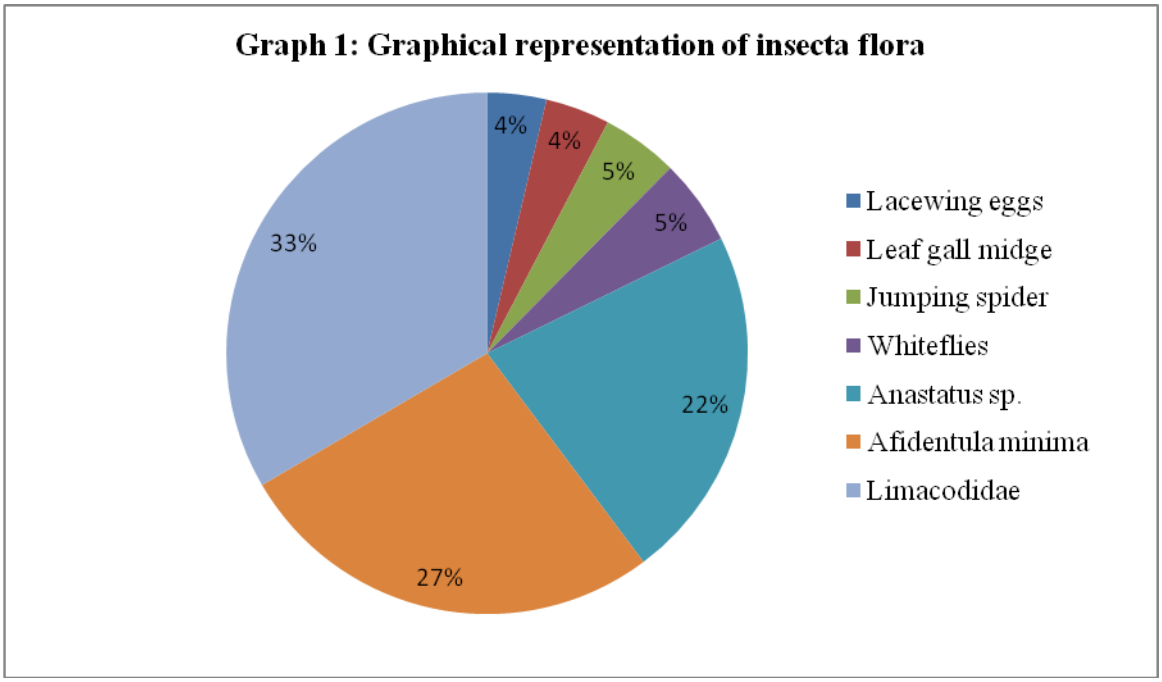

4. DISCUSSION

We could observe a sum of 1499 insects belonging to 7 different species (Table 1), among which Limacodidae sp. were found in large in number and Lacewings eggs to the least. This resembles that the Limacodidae sp. are adapted when compares with rest of the insects observed.

Mango gall fly (Plate5) (Procontarinia matteiana Kieffer & Cecconi, 1906) is an orchard pest that infests flush leaves of mango, forming wart-like structures on the leaves. Serious outbreaks may result in reduced fruit yield. A natural parasite (Chrysonotomyia pulcherimma Kerrich, 1970) of the gall fly lays its eggs inside the gall and the larvae feed on the gall fly. Mango cultivars present varying susceptibilities to gall fly infestation, with cultivars ranging from completely resistant, highly susceptible to intermediate stages where pseudo-galls are formed. The latter cultivars are ovipositioned by the gall fly, but secondary metabolites within the leaves possibly halt the development, thereby preventing the development of true galls. Microscopy was used to identify characteristic features of the gall fly and its parasite inside the gall, to study the development of the insects and to distinguish them. Evidence was obtained that the use of insecticides curbs the development of the larvae. Tissue development within true and pseudo-galls studies provided insights into the role of secondary plant metabolites in arresting true gall formation (Augustyn W.A., 2013).

Infest
Be present (in a place or site) in large numbers, typically so as to cause damage or disease.

Parasitic
An organism that lives off or in another organism, obtaining nourishment and protection while offering no benefit in return.

Whiteflies (order *Hemiptera*) (Plate 6) are small homopteran bugs allied to the froghoppers and the aphids. Their wings are covered with a white, waxy powder, giving them the appearance of minute moths. They all feed on plant juices, which they suck with the needle-like beak typical of all the bugs, usually while sitting on the underside of leafs. The young nymphs move about to start with, but then they lose their legs and remain motionless, just sucking plant sap until they turn into adults.

Many members of the order *Hymenoptera* (Parasitic wasps) (Plate 7) are parasitic in their early stages, living in or on the bodies of other young insects- the hosts (Limacodidae moth, order lepidoptera) - are gradually destroying them (Scoble 1992, Wagner, 2005). The hosts are not destroyed, however, until the parasites are fully fed and have no further use for them. They lay their eggs mainly in the Limacodidae moth (Plate 2, 3 &4) and butterflies too. Some actually grow up inside the eggs of other insects. Hence we couldn't identify the exact species of the moth.

Afidentula minima (Plate 8) are ladybirds beetles (order Coleoptera) belonging to family Coccinellidae. These are brightly colored and very shiny beetles, with domes, rounded bodies. They are carnivorous insects, feeding mainly on aphids, small bugs and mainly on microscopic fungi. This is another evidence to say that the walking mango tree has more microscopic fungi. As observed, they were feeding mainly on the sap, which contains fungi; hence it is known to be rarest ladybird beetle in India.

Limacodidae egg shells on walking mango tree were white in color and brown in color when observed in other mango trees (Plate 9). This difference lead to next level of observation and found out that on walking mango tree we don't find *Oecophylla longinoda* (red ants), whereas its seen on normal mango trees. In order to survive, the moth camouflages with the bark, so that they are not identified. Once the moth grows into adult, they leave these shells, which are occupied by the spiders (Plate 10). We observed the eggs of jumping spiders on the walking mango tree (Plate 11 & 12), while we found the egg remains on the normal mango tree. Apart from the spiders, moth scales were also seen in the shell (Plate 13).

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Lacewing flies (order *Neuroptera*) (Plate 14) are delicate insects, usually with green or brown wings. Most eat aphids in both adult and larval stages. The eggs of the green lacewings have slender stalks attaching them to plant. Many lacewings come into the house to hibernate in autumn, and some turn a rather dirty pink color.

5. CONCLUSION

The insecta flora on walking mango tree has to be conserved for further studies, especially the India's rarest *Afidentula minima*. Much more to be observed upon the insects for the identification of exact species of *Limacodidae* and leaf gall midge. This improves our knowledge on the biodiversity conservation and their unique behavior for survival.

SUMMARY OF RESEARCH

The presence of such a large insecta flora in walking mango tree is quite a surprise, since we don't find as such in the normal mango tree. The presence and absence of *Oecophylla longinoda* (red ants) play a major role in insecta flora. Insects camouflage to bark color, which gives an advantage for not being identified by the predators. We could also see that the eggs shells of *Limacodidae sp.* were utilized by other species for the shelter purpose.

FUTURE ISSUES

If the tree is harmed by any modes of human actions, the tree will be in danger, since its only one of its kind and it's the duty of every person to conserve this tree for a better understanding for the better tomorrow. Furthermore observation has to be made for the identification of different insects, which are not mentioned in the above text. The rate at which the bark being removed will decrease the insecta pollution, since most of them lay eggs on the bark and others live below the bark.

DISCLOSURE STATEMENT

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