

Weaver ants (*Oecophylla smaragdina*): a multi-utility natural resource in Dima Hasao district, Assam

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Abstract

The paper explored the utilisation and benefits of weaver ants (*Oecophylla smaragdina*) among the ethnic tribes of the hill district of North-eastern India viz. Dima Hasao district. The district is inhabited by diverse ethnic groups like Dimasa, Zeme naga, Hmar, Kuki, Biata, Karbi, Khasi Pnar, Hrangkhoh, Vaiphes, Khelmas and Rongmei. These tribes have unique traditions and cultures distinct from each other. Among other resources, insects constitute an integral part of socio-cultural life of these people. Insects are utilized for varied purposes the most notable being for food, medicine and livelihoods. The district with large forest areas remained unexplored, till now no scientific study has been undertaken. But in recent years due to deforestation and acculturation many of the natural resources, particularly the insect resources has been affected to an extent. Weaver ants serve as a delicacy among the tribes. Through this study an initial attempt has been made to document and conserve the important natural resource of the district.

Keywords: Acculturation, Benefits, Ethnic tribes, Insect resource, Unexplored, Utilisation.

I. INTRODUCTION

Weaver ants (genus *Oecophylla*) are social insects of family Formicidae. They are obligate arboreal and known for their unique nest building behaviour where workers construct nests by weaving together leaves using larval silk. Colonies can be extremely large consisting of more than a hundred nests spanning numerous trees and contain more than half a million workers. Like many other ant species, weaver ants prey on small insects and supplement their diet with carbohydrate-rich honeydew

excreted by small insects (Hemiptera). *Oecophylla* workers exhibit a clear bimodal size distribution between the major workers (8-10mm) and minor workers (about half the length of the majors). Major workers forage, defend, maintain and expand the colony whereas minor workers tend to stay within the nests where they care for the brood and 'milk' scale insects in or close to the nests. Adult ants are reddish to brown in colour and have 10-segmented antennae with 2-segmented clubs. Their eyes are relatively larger than those of other species of ants. They do not have stingers, but can give painful bites caused by the chemicals secreted from their abdomen. *Oecophylla* contains two closely related living species: *O. Longinoda* found in Sub-Saharan Africa, and *O. smaragdina* found in India, Taiwan, Southeast Asia, and Australia (Offenberg J and Wiwatwitaya D 2010). They are provisionally placed in a tribe of their own, Oecophyllini. The weaver ant genus *Oecophylla* is relatively old, and 15 fossil species have been found from the Eocene to Miocene deposits (Azuma et.al. 2002). Arboreal life, large reddish body with a fierce bite are among the characteristic features of the ant.

I (i). Nest-building behaviour

Oecophylla weaver ants are known for their remarkable cooperative behaviour producing among the most complex nests. They make nests in trees or on leaves of legumes, or in bunds or levees of the fields. They use fresh leaves to build the most complex nests among ants' nests. The leaves provide well camouflaged protection from predators and the elements (Sullivan R 2012). To create their neat nest, chains of worker ants form along the edge and pull the edges together by shortening the chain by one ant at a time (Fig.1). Once the edges are in place, an ant holds one of their larvae in its mandibles and gently squeezes the larva to produce silk for gluing the leaf edges together. The larvae have special glands to produce lots of strong silk but the adults do not.



Fig.1. Weaver ants building nest

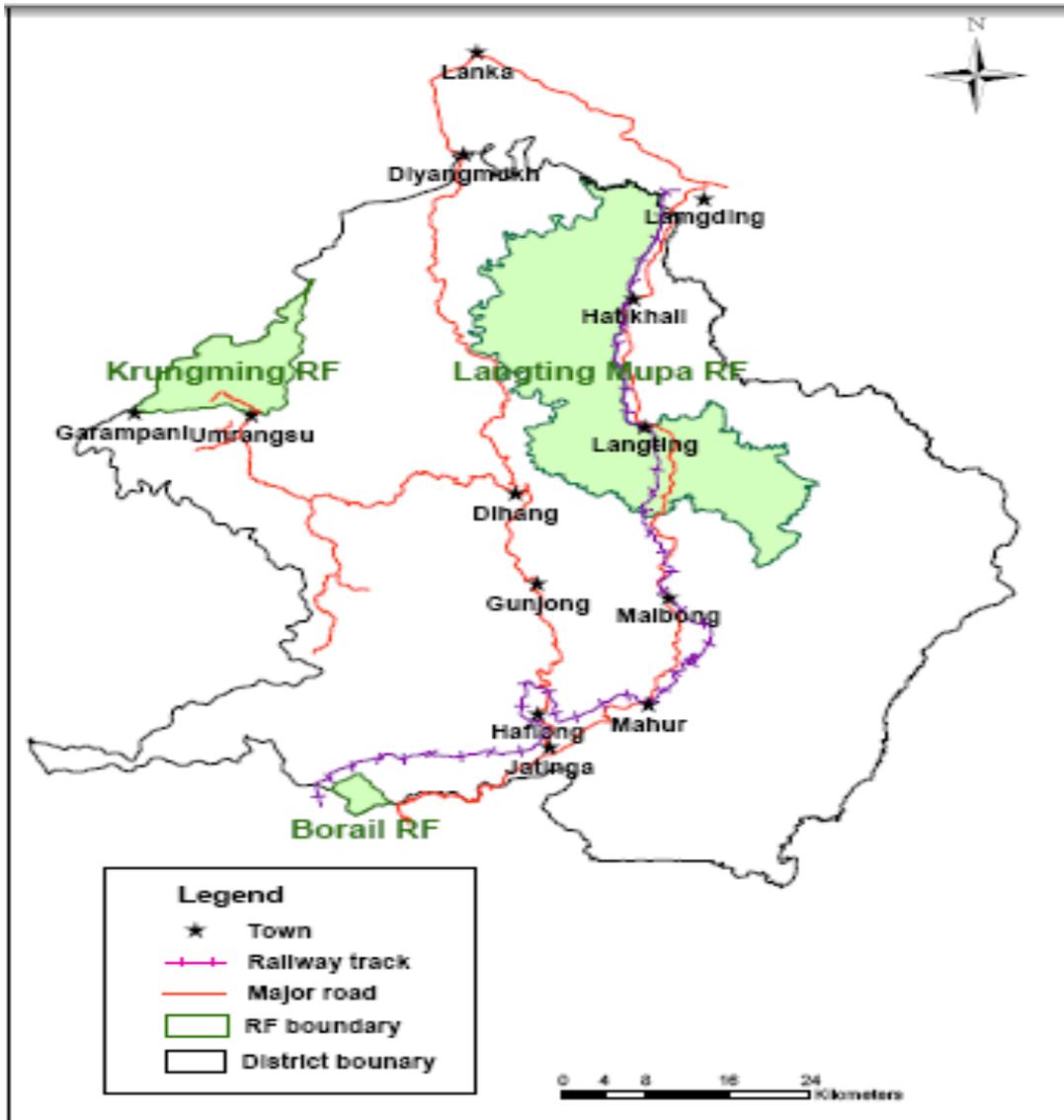


Fig.2. Study Area: Map of Dima Hasao district.

I (ii). Worldwide use of weaver ants

Weaver ants are commonly used as food and medicine throughout China (Li and Chen 1992). These ants are harvested and sold at local and international markets of China as a delicacy and used as medicine in treating various kinds of illnesses. The ancient Chinese as early as in 300 AD, exploited the voracious appetite of these ants by using them to control insect pests in their citrus orchards. *Oecophylla* ants are the earliest recorded biological control agent (Huang & Yang 1987) and are able to control more than 50 pest species in more than 12 tropical tree crops (Way & Khoo 1992, Peng & Christian 2004). A Weaver ants' nest is introduced into the orchard, and the ants encouraged to colonise all the trees by placing bamboo strips among the trees

as "ant bridges". This practice is now being revived as a cheaper means of growing fruit, and dealing with insects that have developed resistance to chemical insecticides.

II. MATERIALS AND METHOD

Different areas of the district occupied by various ethnic cultures were visited and their traditional knowledge with respect to weaver ants were documented. Household survey was conducted. Nests of weaver ants from mango and citrus fruits were harvested.

III. RESULTS AND DISCUSSION

III (i). Weaver ants, multiple utility natural resources

Weaver ants *O. smaragdina* (Fig.3) is a common species in Dima Hasao (24° 3' N to 26° 36' N and 92°7' E to 93°54' E) cultural landscape of 15,322 sq km in Assam state, India (Fig. 2). The ant is known by different names among the diverse ethnic groups inhabiting the region- *Keresma* (Dimasa), *Arti* (Karbi), Biate: *Sethur* (Baite) (*se*: ant, *thur*: sour or sour ant), *Tkusapain* (Khasi Pnar/Jaintia), Singsang (Hmar, Kuki, Hrangkhoh), Ntianrak (Zeme Naga).

A. *A local delicacy:*

O. smaragdina forms an important diet to local populace during the months from February to May which coincides with nest building and breeding of the ants. Both eggs and larvae (Fig. 3) are consumed and at some places sold in local markets to generate cash income. While walking through the local markets we observed the eggs and pupae are placed on leaves (about 200-300 gm) and sold at 20 Indian Rupees. A successful hunting of their nests is a tedious job which requires good knowledge of the life cycle of the ants. The nests are commonly observed in trees with broad leaves like mango (*Mangifera indica* L.), jamun (*Syzygium* spp.), loring (*Careya arborea* Roxb.), narlong (*Cassia siamea* Lam.) and rain tree (*Samania saman*) and other plants. Sometimes these ants choose bamboo leaves to make nests. An experienced hunter can identify nest with maximum quantity of larvae by studying the colour of leaves in the nest. Normally one or two partially withered leaves in the nest is indicator for good harvest. Another indicator is aggressive preying of adult ants indicate nurturing of larvae. The ants are very active and aggressively defend their nest; for this reason one requires sharp knife to cut the twigs holding the nest else one will be bathed with the ants. This character of the ants appears in one of the proverbs of the Karbi people- *nopak sovak arti choho* which literally states 'hunting weaver ants (*arti*) with unsharpened knife (*nopak sovak*).

The primary use of weaver ants is as food but a few ethnic groups are ignorant of its use. Methods of preparation vary among tribe the common method being frying in mustard oil. Among the Karbi community eggs and pupae are baked with banana or

turmeric leaves and then consumed. It is eaten after being fried whereas some cook to make appetizer/*chutney* along with dry fish and other vegetables. Those who had consumed reported the food palatable, tasty, creamy and appetizing. The adults are also eaten but their taste has been described as lemony or creamy and sour. Some has penchant to tear the abdomen and taste the sour content. For its demand as food, the ants (eggs) are sold in local markets for cash income. Use of weaver ants as food is not common among the Hmar, Kuki, Zeme Nagas communities however consume the eggs.

B. As a local medicine

Some of the ethnic tribes of the district use weaver ants both adults and eggs as a local medicine to cure some health problems. The Hrangkhols and Khasi Pnars use the eggs to cure a child suffering from cold and cough and adults are use as a benefit for malaria patient. They are made to take orally after being boiled or fried.

C. Other uses: Uses amongst the various tribes of Dima Hasao district

Dimasa people use weaver ants in their traditional wedding ceremony as a sort of game to annoy the groom's party. As part of the tradition, the latter is stopped at the gate and the bride's party sprinkle handful of weaver ants and enjoys the moment how members of the groom's team get rid of the ants. According to the Dimasas, weaver ants have a peculiar smell resembling kerosene, so the nomenclature *Keresma*, which literally means 'smell of kerosene'. The larvae are also used as fish bait. Larva is attached to fishing hook or larvae are placed in water body connected with river or stream through small opening, in the evening. During the night fishes move to the water body to prey of larvae of weaver ants and at dawn the opening is closed trapping the fishes in the water body. These ants are also used as effective biological control agents against various species of insect pests. Some Dimasa and Khasi Pnar farmers introduce weaver ants' nests in orange trees as they know the ants act as insect predators and helps in controlling insect pests thus, resulting in better production of fruits. Among the Biates, Khasi Pnar, Hmars, Kukis, Hrangkhols, larvae of weaver ants are use as fish feed in ponds, lakes etc. They are not aware of the food value. Biates used to feed chickens with the larvae of the ants.



Fig. 3. Larvae of Weaver ants alongwith its nest



Fig. 4. Larvae of Weaver ants

III (ii). Threats to Weaver ants

Weaver ants (i.e., pupae) are harvested for consumption and other purposes by different tribes in Dima Hasao district, a cultural landscape. Presently due to destruction of forests, urbanisation and encroachment, trees for weaver ants is gradually declining in the wild. As of now the ants have started colonising cultivated

trees in homestead gardens. This presents good scope for domestications and be extremely useful for controlling pest in fruit gardens. This will also do away for the need to travel to forests to collect pupae for consumption. Domestication of the ants can fulfil human needs for the ants without disturbing the wild population. Traditional diet with pupae of *O. smaragdina* forms viable source of nutrition for human health.

IV. CONCLUSION

Weaver ants (*Oecophylla smaragdina*) serve as a delicacy among the ethnic tribes of Dima Hasao district. Eggs of weaver ants are exploited in the local market. People find it nutritive. It is not only consumed but among the Dimasa tribe, who are said to be the earliest inhabitant of the Brahmaputra valley, weaver ants play an important part in their culture. Sometimes eggs of weaver ants are also used as fish feed in ponds and sometimes for controlling pest in the orchard. Thus, weaver ants serve as an important part among the ethnic tribes of Dima Hasao district and it has become essential to conserve an important natural resource of the district.

V. ACKNOWLEDGEMENT

The authors are thankful to the people of Dima Hasao district for sharing their valuable traditional knowledge and for their cooperation and support throughout the research study.

REFERENCES

- [1] Offenberg J and Wiwatwitaya D. 2010. Sustainable weaver ant (*Oecophylla smaragdina*) farming: harvest yields and effects on worker ant density. *Asian Myrmecology* 3.
- [2] Azuma. N. Kikuchi, T. Ogata. K and Higashi, S. 2002. Molecular Phylogeny among local populations of weaver ants *Oecophylla smaragdina*. *Zoological sciences* 19.
- [3] Huang HT & Yang P. 1987. The ancient cultured citrus ant. *Bioscience* 37.
- [4] Way M & Khoo KC.1992. Role of ants in pest management. *Annual Review of Entomology* 37.
- [5] Peng RK & Christian K. 2004. The Weaver ant, *Oecophylla smaragdina* (Hymenoptera: Formicidae), an effective biocontrol agent of the red-banded thrips, *Selenothrips rubrocinctus* (Thysanoptera Thripidae) in mango crops in the Northern territory of Australia. *International Journal of Pest Management* 50.
- [6] Sullivan R. 2012. Weaver ants use corporate memory to defend nests. www.abc.net.au.
- [7] Li, S. and Y. Chen. 1992. Perspectives on ant research in China. *Entomol. Knowledge* 29(3).

