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Wisdom on Flowering and Fruiting in Mango

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Abstract—*The mango (Mangifera indica L.) makes up a significant horticultural blessing of India. No other fruit has such a conspicuous register in written works, verses, mythical tradition, chronicles, painting and statuesque as that of mango. The colloquial name of mango is 'aam' which implies 'the common'. It is not only typical throughout India; but is also the fruit of the ordinary folk people. Like Ayurveda, folk medicine also gives equal importance to preventives as well as curative measures but folk prescriptions are covered in the name of rituals and rites and some other cultural behaviour. In Gangetic West Bengal the folk people have valuable wisdom relating to mango and they undertake their own experimentation in their own ways either in the orchards (for ITKs), or in the kitchens (for folk foods) or in the dispensaries (for folk medicines) and in the mind-land (for folk literature). Therefore, it was worthwhile to conduct a survey in the perspective of mango-lore of the Gangetic West Bengal for collecting and documenting the riches of folklore on flowering and fruiting by participatory rural folk appraisal. The present study is based on intensive surveys carried out over a period of 10 years starting from the year 2005 with a detailed account of the folk wisdom and cultural tradition pertaining to mango cultivation and industry in Bengal. The aggregate of cultural tradition delineating mango flowering and fruiting covers the tradition based cultural expressions exemplified by non-material folklore (viz. riddles, proverbs, sayings, folk tales, folk songs etc.).*

Keywords*: Indigenous knowledge, flowering, fruiting, mango*

1. INTRODUCTION

Mango (*Mangifera indica* L.) is the most excellent among the sub-tropical fruits of India in scrutiny of the acreage, assembly and appreciation among the people. It is now extensively extend all throughout the tropics and subtropics. Mango is magnetized to all young or old and rich or poor. From long past, Indians have a great fondness and attraction for this very fruit.

There is no recorded evidence of any study with folk wisdom on flowering and fruiting on mango so far as the present authors' knowledge goes. This study is one of the new endeavors to explore the mango bottomed folklore on flowering and fruiting on mango of Bengal. The present authors are using the word 'mango-lore' to indicate the summative of cultural tradition delineating mango. This is a compound word by dividing it into 'Mango' and 'lore'. Lore means learning. It is a set of knowledge of folk. Lore created and possessed by the mango growers is called mango-lore. Mango-lore is the scientific learning of folklore of mango by the authorities.

2. MATERIAL AND METHODS

Folklore is a flock- directed and watching-supported standard of a population of personage reflecting the best guess of the group as a plenty communication of its cultural pattern. Its variety included language, literature, music, dance, games, mythology, rituals, customs handicrafts, architecture and other arts. There is a close-set association between knowledge and folklore. Folklore, in fact, is the 'language of root' and the 'song of soil'. That is created in the minds of human beings in associated with the crop fields. 'Folk' means the similar group of populace united by ethnic, semantic, theological and artistic affairs. 'Lore' is spread in the life ways and values and it leaves behind from generation to generation by plain words of mouth. In human society there is scarcely any subject that folklore has not contacted. Just as crops grow up in land, and a stink of the soil sticks to it, likewise folk literatures also have a aroma of the soil in them.

Folk wisdom is knowledge that is distinctive to a set province, traditions and society. Folk wisdom is originated from the beliefs, culture and customs of folk people. This indigenous knowledge is used at the micro level in a given agro ecosystem. It is no doubt that for every folk technicality there was a primitive pathfinder or technician who actually innovates any idea or rule but with the passage of time that may be modified and amended by the folk people. Therefore, folk wisdom is the wealth of a folk, and the credit is not claimed by any individual. Wisdom may be of two types – technical and non technical. The folk technical wisdom is used as the basis for decision making pertaining to food security, human and animal health, natural resource management and other vital activities. There is a minor difference between folk wisdom and folk knowledge. Wisdom means the body of knowledge and experience that develops within a specified society or period. Knowledge means information and skills gained through experience or education. Folk wisdom means unique, elementary and inherent uninfluenced knowledge base of a particular folk group from time immemorial. That is

obviously location and culture specific and transmitted orally generation after generation in simply words of mouth.

3. EXPERIMENTAL AREA

West Bengal is a part of the Eastern India, located between 21°31´ and 27°14´ N latitude and 85°51´ and 89°E longitude. The tropic of cancer passes through the middle of the state covering the districts of Nadia, Burdwan, Bankura and Purulia.

The experimental area is under the Gangetic Alluvial Zone. It includes Gangetic Flood plain Region. Climatically the region comes under tropical humid with rainfall of 1350 to 1650 mm, temperature maximum 35.0°C and minimum 15.6°C (Annual normal).

The region is composed of alluvium carried by river Ganga and its tributaries and may be broadly classified into Ganga upland with relatively matured alluvial soil, Ganga flat land with matured soil and Ganga reverine receiving fresh alluvium recurrently.

Soils are very deep medium fine to medium in texture, neutral to midly alkaline in pH. Calcareousness is significant in large section, base saturation moderately high, NP status medium to medium low and potash status is medium to high, external drainage medium to low and internal drainage is moderate.

Extensive use of ground water by DTM and STW and surface water with the help of river lifts and numerous pump sets have brought in intensive multicrop approach in this region indulging simultaneously the problems and crisis through over use of land and water resources.

People's participation means getting people physically and mentally involved in certain activity. People's participation is a central feature of contemporary rural development and extension efforts throughout the developing countries across the world. Across the third world, examples are too many, sharing the extent of innovation and local level knowledge base possessed by the farmers. Such items of knowledge are strewn across the rural society in the form of practices, folklores, verses and words of mouth usually with the elderly persons, as it often happens in tribal societies. However, often the hardcore scientists are tempted to ridicule them and dismiss local knowledge as useless. But growing awareness on the value and potential of learning from such knowledge base are witnessed.

There is an astonishing fact that like other farmers, fruit growers as well as mango orchardists have valuable wisdom. They undertake their orchard experimentation in their own ways. A critical analysis of existing folk wisdom in the perspective of mango-lore and integrating the same with scientific base for boosting productivity with a sustainable manner is of immense value. To achieve the objective of travelling on the riches of mango-lore of Gangetic West Bengal, a brief methodology has been worked out and given here.

Participatory Rural Appraisal (PRA) was the methodology for interacting with the mango growers and traders as well as villagers, understanding them and learning from them. It provided an alternative framework for data collection and analysis. Because of its participatory nature, it is a useful methodology to focus attention on people, their relationships with socio-economic and ecological factors.

Participatory Rural Appraisal is the way of enabling communities to define, evaluate and influence their economic, environmental, health and educational status. It is an intensive and systematic learning experience carried out in a community.

For effective interaction between the mango growers and researcher, an ice-breaking session for building rapport was held with the help of village leaders and progressive farmers. Ice-breaking is an equalizing exercise where both the farmers or local people and the outsiders come closer mentally that lead to creation of an environment wherein Participatory Learning Exercises as a means of doing PRA may be accomplished more conveniently.

A transect walk and bio-diversity walk was undertaken by this researcher to observe and record details of diversity of mango based agro-ecosystems. The transect walk exercise is a systematic walk along with source mango growers with folk wisdom and experience profile to observe topography, water regime, soil type, vegetation, enterprises, problems, solutions etc. of a given agro-ecosystem. To gain an understanding of the complexities of a situation, to get in-depth information about community participatory data generation process was adopted

To explore the horticultural knowledge in the folklore items Content Analysis (Berelson, 1952) had been undertaken.

4. OBSERVATIONS

A. Folk Literature

Riddle

The riddle incorporates a question primarily and an answer secondarily. Some riddles on mango current in Gangetic West Bengal are listed:

1. Maghe janom tar phalgune chae

choitir barhe tare kichu kichu khae

khae tare boishak ar joithe

ei poi bhangaite pondit oi phate.

In this riddle the phenological cycle of fruit along with its maturity is briefly sketched by the folk-poet of rural Bengal.

2. The growth and development of fruit is also portrayed in another riddle:

Maghe bol phagune guti choitre katikuti

boishakhe ati joitsthe chushi. I

The chronicle of fruit development is like this (Table 1).

Table 1: Chronicle of Fruit Development in Gangetic West Bengal

Sl. No.	Bengali Month (As stood in Riddle)	English Months	Growth Stage
1.	Magh	Middle of January to Middle of February	*bol* (i.e. Panicle Emergence)
2.	*Phalgun*	Middle of February to Middle of March	*guti* (Fruit Setting)
3.	*Choitra*	Middle of March to Middle of April	*katikuti* (Marble Stage)
4.	*Boisakh*	Middle of April to Middle of May	*ati* (Stone Formation Stage)
5.	*Joistha*	Middle of May to Middle of June	*chushi*(Ripening Stage)

3. Etotuku dale bostom dole.

Stylistically the bearing of mango in a shoot is a simile to the Lord Krishna in a rocking cradle.

4. Mango has a fleshy, fibrous or non-fibrous mesocarp along with coarse, long or short fibres covering the large flat stony endocarp. This fibre is analogous to the human hairs in folk stylistics.

Akasete dhulumulu patalete les

kon khodae banai raikhe bukor bhitor kes.

5. Red ants (Oecophylla smaragdina Fabr.) though not directly injurious, act as distributing agents of noxious scale insects (Aspidiotus destructor S.) and mealy bugs (Drosicha mangiferae Green) from tree to tree. In a riddle the morphology of a red ant is beautifully narrated.

Lalboron choe choron pet katile hate

murkhe ki bhangaiba ponditeri phate.

Mango fruit borer (*Deonalis albizonalis* Hampson) infests marble size of the fruit in the Gangetic West Bengal. The larvae feed within the fruit and makes tunnels inside and the infested fruits drop. The pupation may take place inside the fruits. The adults come out of the fruit through exit holes. In a riddle the food habit of the fruit borer is beautifully sketched.

Maer gorbhe thakia maer mangsoo khae

matite poria se choe paee jae.

7. There is another riddle regarding inflorescence of mango which is also very famous in Gangetic West Bengal among the migrated people of Dhakha of the then East Pakistan (now the capital of Bangladesh). The riddle is as follows

Tin okkhore nam tar am gache hoe

protham okkhor chhere dile sarboloke khae.

Meaning: Word having three syllables, delete the first one and is accepted by all as edible one. The answer is 'Mukul' or inflorescence of mango. By deleting '*Mu*', the new word is *'Kul'* or Ber (*Zizyphus mauritiana* Lam.). *Kul* or ber is one of the most common fruit trees of India as well as Bengal and is grown all over the Gangetic West Bengal.

Khanar Bachan

Nothing exact is known about the learned Bengali woman *Khana*, the author of '*Khanar Bachan'* or the propositions of *Khana*. There are many proverbs current about the life of *Khana*. There is necessity of extensive research on the times of *Khana*, her identity, historical context, anthropological, linguistic analysis of *Khana*'s sayings as also about the geographical, economical and social environment of those sayings. May be, *Khana* was not her actual name, but the sayings are ascribed to that name. According to hearsay, *Khana* was contemporary of Baraha Mihir, the most famous astrologer of ancient India. The sayings of *Khana* are composed in rhymes and language of which are very familiar with the people of Gangetic West Bengal and so these continue to be prevalent here through ages. Even today the life philosophy of rural Bengal is modelled after the sayings of *Khana*. One cannot deny the importance of '*Khanar Bachan*' which are followed by the farmers of Gangetic West Bengal and thought to be rewarding for hundreds of years (Bandyopadhyay and Chakraborti, 2003).

Khana prescribed precisely how to cultivate mango and jackfruit. She prescribed the optimal planting distance, plant density, time of planting of grafted propagules. It is said by her that plant density should 30 ft apart from each tree. More density will give rise only vegetative growth, not the flower and fruits for want of Sunlight. She also advised the orchardist-folk to plant mango through vegetative propagation in the monsoon months.

Khana predicted that the never the fog, never decay of mango but not in case of palmyra palm and tamarind.

Jato kua amer khoe tal tetuler kiba hoe.

Incidence of powdery mildew disease in mango is observed from 2nd week of February if there is a cloudy or foggy weather during the inflorescence stage of mango. A maximum temperature of 25.4^{0}C to 31.9^{0}C and a minimum of 14.6^{0}C to 18.3^{0}C having 86% relative humidity is the congenial factors

for outbreak of this disease. A few hours rain followed by bright Sunlight with the above said factor found to be a factor for quick spread of this disease. The inflorescences of mango are dropped turning black in the presence of powdery mildew. Thus havoc is caused to the mango production. On the other hand, the flowers of palmyra palm (*Borassus flabellifer* Linn.) or tamarind (*Tamarindus indica* Linn.) are not affected in foggy weather condition. In one Bengali proverb it is stated clearly that the shower of *phagun* (Feb-March) causes havoc to the mango panicles. Such havoc is also noticed in case of *amra* and *simul* (*Bombyx malabaricum*).

Am amra shimul phaguner jole nirmul.

Eminent Bengali writer and artist Abanindranath Tagore wrote in a rhyme that king fruit mango is encountered with many adversities but there is no malady to Babla (*Acacia arabica*) fruits in any time

Modhu phal amre dyakho koto pore bighno

bablar phole nei konokale bhagno.

Proverbs

Amer ana macher kona.

Mango fruits and its inflorescence are affected by different insect-pests, disease organisms and adverse weather conditions like fish fingerlings. Ripe mangoes are to be attacked by fruit fly and other harmful insects. So it is clearly said in a proverb that ripe mangoes are affected by insects.

Folk Song and Folk Drama

Mango bears 'fat' and 'lean' crops in alternate years. When mango produces heavy crop, the cropping season is called the 'on' year (*Jilan bochhor*). When it produces a poor or lean crop, the season is termed as 'off' year (*Opholala bochor*). During the fruiting season, an estimated proportion of 25 per cent of the total population in the leading mango growing districts are engaged in various activities like watching, plucking, carting, basket-making, packing-cum-loading, transporting whole selling, selling on commission, processing etc and keep up their subsistence by means of this crop directly or indirectly (Jha and Sarkar, 1991). Therefore, off year creates a great problem to the folk people. This miserable situation is depicted in a *Gambhira* song.

Bolbo ki gan ohe sib bagane nai am

gace gace beria dekhi nuton pata sab soman

mone mone bhabci bose kajer kono paina disha.

B. Flowering in Mango and Folk Knowledge

Flowering in mango is a complex phenomenon, which embraces several biotic and abiotic factors. Despite the failures in understanding the physiology of mango flowering, some aspects which promote and which hinder or prevent flowering in mango are pointed out by the folk people of Gangetic West Bengal although their physiological and biochemical roles are not fully understood and clear.

It is a common folk observation that the eastern side of mango tree flowers a few days earlier than other sides. The simple reason is that eastern side receives sun light for longer hours. It is also observed that top most portion of the tree (*phulani*) flowers earlier.

The merchant-folk generally purchase the garden observing the inflorescence in the northern side. The scientific basis is that lower percentage of hermaphrodite flowers is reported in the eastern side of the tree, which often gets more sunlight. Higher percentage of hermaphrodite flowers was observed on the northern side, which gets less sun light.

The importance of flowering in the inner portion is more in commercial point of view not only because of higher percentage of perfect flowers but also fewer prunes to external hazard like hailstorms. Leafy panicle (*pata mukul*) may not be beneficial if leafy growth is higher than reproductive growth in a particular shoot.

The merchant-folk believe that medium sized panicle is more fruitful than lengthy panicle. According to their opinion, fruits bear in middling panicles are persistent in nature and less prune to premature drops.

The mango produces blossoms mostly from terminal shoot buds, rarely from axillary buds (*Doji mukul*) particularly in cultivar Fazli when weather is favourable. '*Doji mukul'* bears moderate crop.

In Malda early panicle producing in the month of February is called '*birbag*' which yields a good crop. There are three types of panicles based on their time of initiation viz. (i) *birbag* (Early), (ii) *majhari* (Medium) and (iii) *namla* (Late)

In Malda which experience a sharp winter, flowering continues in two or three distinct flushes for a period of 6-8 weeks on different branches of the tree and it continues upto the end of February. A few proverbs tell like this:

Phaguner aat ja phutbi phute phat na phutle samoshto kat.

Choiter at tarpar sab kat.

The bearing can be assured by observing the leaf colour, texture and age. Well shaped, healthy, deep green and glossy leaves chikon pata indicate heavy crop. There are about three flushes of foliage growth after Shrabon (July-August) particularly in the variety Langra. According to the opinion of the merchant, cessation of the growth in Shrabon seem to be conducing to regular bearing as the vegetative flush requires at least 6 months maturity (gorvo).

Erratic rainfall leads to instability in mango production. This knowledge is preserved in a common saying: phaguner jol agun. Rain or cloudy weather adversely affects the setting of fruits in the months when the tree flowers.

D. Vocabulary

A brief list of vocabulary pertaining to mango industry in Malda is given hereunder (Table - 2).

Table 2: Folk vocabulary pertaining to mango industry

Sl. No.	Vocabulary	Meaning
1.	*Dokhna*	Hot strong southern wind in the summer months with temperature ranging from 46^0 to 50^0C which causes sunburn to the flower and fruit
2.	*Jilan bochor*	On year of production
3.	*Ophola bochor*	Off year of production
4.	*Jor laga*	Grafting
5.	*Thal*	Scion stick
6.	*Birbag*	February Inflorescence
7.	*Namla mukul*	March flowering
8.	*Doji mukul*	Axillary bud
9.	*Chikon pata*	Physiologically matured leaf ready for flowering
10.	*Pala pora*	Snow fall
11.	*Musaria*	Lentil size fruit
12.	*Golmoric*	Pea nut size fruit
13.	*Tikoli*	Larger than marble size fruit
14.	*Modhu laga*	Sooty mould (*Capnodium mangiferae*) infection
15.	*Modhu poka*	Mango hopper *Idioscopus niveosparsus* (Leth)
16.	*Dhoa poka*	Black tips due to the effect of brick fields
17.	*Tikia para*	Anthracnose disease by *Colletotrichum gloeosporioides* (Penz.) Sacc
18.	*Suli poka*	Fruit borer *Deonalis albizonalis* Hampson
19.	*Thusi*	Pole harvester
20.	*Khungi*	Bamboo basket for harvesting
21.	*Kyat*	Small and low graded, rejected mango
22.	*Korma*	Small size fruit but greater than '*kyat*'
23.	*Mamuri*	Hidden or concealed mango
24.	*Phulani*	Top position of the tree
25.	*Khacha*	Stacked dry leaves for fuel purpose; dry twigs for fuel is '*lokri*'
26.	*Dona*	Cattle protector
27.	*Kuria*	Hut like structure for watching
28.	*Macana*	Raised bamboo platform for watching
29.	*Diet*	Turmite or white ant
30.	*Upra*	Evil spirit believed to be dwelled in mango tree
31.	*Atha jhora*	Stem bleeding
32.	*Aab or kana*	Trunk gall in mango tree
33.	*log*	Trunk of mango tree
34.	*Jongli*	Ephiphytic weeds
35.	*Byana*	An ephiphytic weed Loranthus *Dendrophthoe falcata* (L.f.) Etting; Family- Loranthaceae
36.	*Patta*	Mango Leaf
37.	*Maoul*	Mango Panicle
38.	*Pollo*	Mango Shoot
39.	*Bor*	Mango fruit pulp
40.	*Chokka*	Peel of the mango fruit
41.	*Gutthi*	Stone of the mango fruit
42.	*Kara*	Young seedling of mango
43.	*Pait*	Labour in mango orchard
44.	*Pata mukul*	Leafy panicle in mango
45.	*Paikar*	Middle men in marketing channel
46.	*Phore*	Middle men in marketing channel
47.	*Aarotdar*	Middle men in marketing channel
48.	*Barial*	Middle men in marketing channel

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