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AZADIRACHTIN – TOO MUCH OF A GOOD THING?

Currently, there are several commercial neem formulations that are available in the market. Many of them are marketed with *Azadirachtin* content ranging from 300,000 to 500,000 parts per million (0.03% to 5.0% concentrations). There are several farmers and cultivators of horticulture and cash crops who are spraying these formulations liberally, hoping to control the pest in an eco-friendly way. A recent study carried out by scientists at the Department of Entomology at the University of Agricultural Sciences,

G.K.V.K Bangalore has raised some interesting and uncomfortable questions about the efficacy of these formulations. These scientists tested eight commercial formulations that are widely sold and available in the market. The assays were conducted against second instar larvae of Diamondback Moth (DBM). One would expect that by using the formulations with higher concentrations of *Azadirachtin* the LC50 for the pest would be achieved at much lower values. However, much to the surprise of the authors it was found that the LC50 (in terms of the concentrations of *Azadirachtin*) actually **increased** with the concentration of *Azadirachtin* in the neem formulations. That is to say the greater the concentration of *Azadirachtin* in the neem formulation, the greater was the amount required to achieve a 50% kill! The authors feel that this could be due to two possible reasons. One, the concentration of *Azadirachtin* may result in the loss of other (possibly synergistically) active components found in neem which are lost due to efforts of concentration of one chemical. Secondly, *Azadirachtin* has several effects on the biology of insects. Different activities may be pronounced at different specific concentrations and antifeedant or repellent effect may be less at higher concentrations.



Dr. Ganeshiah, in an editorial reference to this paper has commented that – "...we better kill by kernel extracts than by pills made out by extracting the chemicals from the extract".

Source: Azadirachtin use efficiency in commercial neem formulations by A. R. V. Kumar, H. C. Jayadevi, H. J. Ashoka and K. Chandrashekar, Department of Entomology, University of Agricultural Sciences, G.K.V.K., Bangalore 560 065, India – Current Science volume 84 Number 11 10th June 2003 pgs.1459-1464

Compilation : A.V. Balasubramanian



NUTRIENT MANAGEMENT IN ORGANIC COTTON CULTIVATION

A group of scientists have worked on nutrient management in organic cotton cultivation. S.S. Kulkarni, Raghuram Patil and M.N. Malawadi of College of Agriculture, Raichur have conducted experiments regarding this in several parts of Karnataka. They found that application of Farmyard Manure increased the yield of cotton upto 37% over control. Application of groundnut cake or neem cake was also found to be beneficial.

Cultivation of Green Manure Crops also supplies optimal quantities of Nitrogen that is ideal for cotton production. At Coimbatore, cotton yield increased by 16 – 20% with the application of 12 – 18 t/ha of green manure. Green manuring of intercropped cowpea was found to be beneficial in cotton. At Darwad (Karnataka), three rows of a few leguminous crops were intercropped in normally spaced cotton (120 x 60 cm) and incorporated after 45 days. Horsegram, sunnhemp and lucerne resulted in higher lint yield of cotton. Intercropping of legumes (sunnhemp/horse gram / cowpea etc.) for incorporation as green manure at Coimbatore helped to reduce Nitrogen requirements in cotton to the extent of 25%.

Seed treatment with Azotobacter markedly increased cotton yield – up to 16.6% increase was observed due to seed inoculation with Azotobacter. Similarly, the responses with Azospirillum were promising. The Nitrogen fixing potential of Azospirillum has been reported to be 40 – 60 kg Nitrogen/ha/year. Seed and soil treatment of Azospirillum has been reported to save 20 kg N/ha in cotton in Tamil Nadu.

Under rain fed condition, cotton is often intercropped with short duration pulses or oil seed crops with economic benefits. It has also been reported that intercropping of normally spaced cotton with mung increased cotton yield substantially. Rotation of cotton crop with soybean or lucerne increased the yield

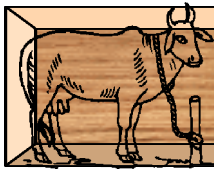
considerably. Research conducted at Raichur, revealed that the highest seed cotton yield (1544 kg/ha) was noticed with the combined application of FYM, vermicompost and cotton residues together in one third proportion each. The next highest yield (1505 kg/ha) was obtained when cotton residues were applied and 1484 kg/ha yield was obtained when farmyard manure and vermicompost was applied in equal proportion in cotton – sunflower / bengalgram cropping system.

Source : Agrobios, May 2003

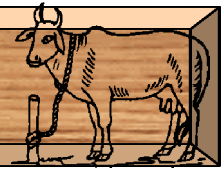
Compilation : H. Saraswathy

FUMIGATION COMBINED WITH OTHER ORGANIC METHODS FOR DISEASE CONTROL

10% cow's urine extract should be sprayed for crops affected by disease. On the same day or the next day fumigation should be done in the evening. Vaividanga (*Embelia ribes*) is powdered well (200 gms per acre). It is then put in a wide mouthed pot with burning charcoal and one has to walk in the field in a direction opposite to the wind. On the 7th day after fumigation 300 ml of sweet flag (*Acorus calamus*) extract along with one litre of cow's urine is mixed with 8.7 litres of water (measurement for one tank) and sprayed on the crop. Sweetflag extract is prepared by soaking 500 gms of sweetflag powder in 2 litres of water and then filtering the same. This method prevents wilting in chilli.



SOME TIPS FROM ETHNOVETERINARY MEDICINE



FOR CRAMPS : Mix Plantain (*Musa sp.*) leaf juice and a handful of Periyangai (*Polygala elongata*) Grind it and dissolve in ½ litre of water. Feed this once a day. Alternately, dissolve 100 gms of ginger (*Zingiber officinale*) powder, 100 gms of cumin (*Cuminum cyminum*) powder, 20 gms of Asafoetida (*Ferula asafoetida*) in 1 – 2 litres of water. This should be given orally.

FOR CONSTIPATION : Dissolve ginger powder and salt in hot water and give orally. In case of pain, mix pepper (*Piper sp.*) powder also.

PURGATIVE : Mix 100 ml of ginger extract with 250 ml of castor (*Ricinus communis*) oil or linseed oil and give orally.

DIARRHOEA : For diarrhoea, give 3 Banana flower buds and 2 large pieces of turmeric (*Curcuma longa*) orally. Extract of Pomegranate (*Punica granatum*) leaf and fruit skin can also be given orally.

COUGH : Mix bamboo (*Bambusa sp.*) leaves or Adhatoda leaves with 100 ml ginger juice and jaggery and give orally. Whole plant extract of Kandankatthiri (*Solanum xanthocarpum*) is mixed with water and given as nasal drops.

RETAINED PLACENTA : Prepare Lady's finger (*Abelmoschus esculentus*) sauce with 250 g of old jaggery and 250 ml of gingelly oil and give orally.

MASTITIS : Mix Aloe (*Aloe vera*) and chalk and apply it on the udder.

MASTITIS, NECK INFLAMMATION & BOILS : Mix 5 g of Elephant creeper (*Entada phaseoloides*) with grounded turmeric. To this, add 100 ml of castor oil. Apply this on affected areas.

TEAT FISSURES : (a) Ice fomentation can be given. (b) Mix Tea leaves (1 teaspoonful) with 1 cup of water. Boil it, add Alum and dissolve it. It can be applied on teats frequently. (c) Apply butter or gingelly oil mixed with turmeric or apply

castor oil. (d) Hot water fomentation with alum for fissured udder and teat.

BLEEDING FROM UDDER : Apply cows ghee in udder

INCREASE MILK SECRETION : Fried and finely grounded millet is mixed with bottle gourd (*Lagenaria siceraria*) and fed orally.

BURNS : Honey mixed with coconut oil or butter is applied externally.

MOUTH WOUNDS : Juice of *Leucas aspera* with camphor is applied externally.

Wash the wounds with a mixture containing alum 15 g and 1 ounce of water.

BOILS : Apply Pungan (*Pongamia glabra*) oil or opuntia flower paste or wash the wounds with the solution containing alum and copper sulphate or apply *Andrographis paniculata* paste.

POX BOILS IN UDDER : Give fomentation and apply alum powder.

ECZEMA : Apply *Cassia alata* leaf paste with coconut oil or apply sulphur with mustard (*Brassica juncea*) oil.

LEG SWELLING : 3 pieces of palm jaggery and gingelly should be given orally or the leaves of *Cassia auriculata* is boiled and mixed with buttermilk and given orally.

FOR CONCEPTION : Prepare a paste of Cow thorn (*Tribulus terrestris*) (large size) – 100 g, Worm killer (*Aristolochia bracteolata*) – 100 g, salt – 10 g and give orally once in 3 days.

TO REDUCE BODY FLUID AFTER CALVING : Coriander (*Coriandrum sativum*) soaked in water is mixed with dry ginger and palm jaggery and given orally.

Source : Dr. G.M. Abdul Razak
Retd. Deputy Director - Animal Husbandry
Plot No.163, Anna Nagar,
Madurai 625 020

NEWS FROM AROUND

BREAST CANCER AND ORGANOCHLORINES

The past few decades have witnessed a marked increase in the incidence of cancer, most particularly breast, prostate and testicular cancer. Breast cancer now affects one woman in ten in developed countries. There is a correlation between exposure to oestrogenic compounds and an increased risk of developing breast cancer. In this new study blood levels of HCB and DDT were compared in 159 women with breast cancer and 250 apparently healthy women. Mean levels of DDT and HCB were significantly higher in breast cancer patients than in the control group (3.94 parts per billion v 1.83 parts per billion, $p < 0.0001$). This study adds considerable weight to contentions that exposure to organochlorine pesticides increases the risk of breast cancer.

— C. Charlier, A. Albert, P. Herman, E. Hamoir, U. Gaspard, M. Meurisse, and P. Plomteux, *Breast cancer and serum organochlorine residues, Journal of Occupational and Environmental Medicine, 2003, 60 : 348-351.*

CONTROL OF RHINOCEROS BEETLE IN COCONUT

Rhinoceros beetle – *Oryctes rhinoceros* is a severe pest damaging coconut fronds, flowers and young fruits. The adult beetles burrow by remaining in between the leaf sheaths near the crown. They chew the fibrous tissue and cause holes. This results in stunting of trees and death of plants. Several methods to control this beetle have proved to be difficult. However, there is an indigenous method of controlling these pests which is quite effective. Farmers of coastal Orissa grind seeds of Castor (*Ricinus communis*) and boil them in big earthen pots till a thick scum of oil floats on the surface. Three to four kg of seeds are sufficient for pots of ten litre capacity. These

pots are then kept in coconut orchards. The beetles get attracted by the smell and odour that comes out from the boiled castor seeds, get trapped into the oily extract and finally gets killed. This method is quite effective and eco-friendly.

Source: Agrobios – April 2003

COW'S URINE REPELS WHITE FLIES

White flies (*Bemisia tabacci*) are a major pest of cotton. Cotton farmers of Senegal have found an indigenous method to drive away these pests which could not be controlled by several pesticides. They collected cow's urine and allowed it to ferment for few days. This was diluted and sprayed over the cotton plants to control white flies. It also served as a good weedicide by killing the newly sprouted weeds.

Source: Natural Product Radiance Vol 2(1), January – February 2003

PEPPER AS A PESTICIDE

The fruits of *Piper nigrum* have always been used as a spice and as a medicine to cure several ailments. Scientists from South Korea have recently discovered the pesticidal properties of pepper. It has been found to repel adult insects of *Heliothis zea*. Powder prepared from dried seeds of black pepper repel the corn earworm and weevils found in rice, beans and the pulse beetle. Oil extracted from dried black pepper berries is toxic to rice weevil. Hence the oil is used extensively for the protection of stored products. It has been found to be effective for 2 months in controlling saw-toothed grain beetle, lesser grain borer and corn weevil.

*Source: Natural Product Radiance –
March- April 2003*

Compilation : H. Saraswathy

ORGANIC FARMING WITH ALPHONSO MANGO

“Mother India Farms” near Morappur Railway Station in Dharmapuri district of Tamil Nadu highlights the success story of the two farmers M/s. Durairaj and Palanivelu. The farm covers an area of 100 acres of organically grown Alphonso Mango.

These farmers were originally practising inorganic farming, using all the chemicals available in the market. The chemical ‘cultar’ had a detrimental effect on the trees. They noticed that the trees lost its vigour. This alarmed the farmers and they decided to shift to organic farming. Although the farmers faced problems initially, they decided to go ahead with organic farming. They saw to it that there was no inorganic farming going on in an area of 10 km around the orchard.

The orchard which was established in 1998, now bears ‘Earthern Delight’ (Organically grown mangoes). Their success began with the choosing of the 100 acre land in the dry belt of Dharmapuri district which was suitable for mango cultivation. The land was used as such without much of disturbances to harness the benefits of the top soil completely. The saplings were planted with a space of 20 feet between them and irrigated through drip irrigation with 40 litres of water / tree at an interval of 4 days. The water was obtained from 3 borewells and an open well. Arrangements were also made to harvest the rain water.

15 kg of rotten farmyard manure per sapling was applied and watered immediately. ‘Neemsol’ and ‘Vanish’ (organic products) were used against insect pests and fungal diseases. The harvested fruits were ripened naturally using paddy straw. The fruits were then stored, graded and packed in cardboard cartons.

The trial sale at Bangalore and the domestic sale has proved to be successful. ‘Earthern Delights’ are certified by IIHR (Indian of Horticultural Research) for its organic input. The farmers are now looking up for a suitable certificate from the government for export.

In India, going organic is really an uphill task but, definitely not an unimaginable task. According to a recent report of International federation of organic agriculture movement, the total area under organic farming has increased to 41,000 hectares. 0.03% of India’s arable land is under organic farming. With the increasing demand for organically grown products, the percentage of organic farming would increase if the government provides the needed help such as simplifying the certification procedure, reducing the fees etc. The government should encourage farmers of all strata to take up organic farming.

Source : Kisan World, July 2003

Compilation : T. D. Nirmala Devi

Growth forecast for specific organic products in the domestic market

Product	% Projected growth in the 5 next years
Spices (all)	14
Pepper	5
Turmeric	4.5
Tea	13
Rice	10
Fruits (all)	8
Banana	15
Mango	5
Orange	5
Pineapple	5
Herbal extracts	7
Cotton	7
Coffee	5
Oil seeds	5
Honey	5
Groundnut	5
Baby food	5
Coconut	5

Source : Org-Marg, 2002

SPECIALITY RICES OF THE WORLD : *Breeding, Production and Marketing* by Ram C. Chaudhary, D.V. Tran and R. Duffy (eds). FAO, Rome

Rice is one of the very few crop species with rich genetic diversity. Over 100,000 landraces and improved cultivars largely account for such a diversity. African rice *Oryza glaberrima* is not differentiated. Asian cultivar *Oryza sativa* is domesticated into three geographical races - (a) *indica* (b) *japonica* (temperate) and (c) *javanica* (tropical japonica)

COOKING QUALITY : There are three types, namely - soft and sticky cooking of japonica – low amylose (~15%) and medium gelatinization temperature, dry and flaky cooking indica – due to high amylose (>25%) and medium to high gelatinization temperature and rubber like cooking of waxy rices (pudding rices found in small pockets in south and east asia) – due to very low amylose (0 – 5%). Basmati and jasmine rices of India and Thailand stand between indica and japonica in starch characteristics coupled with pleasant aroma and excessive elongation on cooking.

SPECIALITY RICES : Basmati from India and Pakistan and jasmine rices of Thailand are well known. There are also coloured rices in red, black and saffron colours. Waxy rices (puttu rices of India, heinue of China), wine rices (saki wine of Japan), wild rices (asian rice *O.nivara* and american *Zizania aquatica*, which botanically does not belong to rice), are some other speciality rices.

HISTORICAL PERSPECTIVES : The black coloured rice or ‘black pearl’ are reported to be rich in trace elements and vitamins. In China, waxy rices (heinue) are believed to be ‘health rice’. Soft rices found at higher altitudes in China and India have very low amylose (less than 10%) and cook at low temperature – energy saving rices. Over two million tonnes of rice are converted into wine each year in China and similarly a sizeable amount in Japan. ‘Feed rice’ grains are used as animal feed and the green vegetative part used as fodder. Very high yielding varieties (10 – 11 tonnes per hectare) of coarse grains with high protein – not ideally suited for human consumption are feed rice.

Excerpts from the review of the book in the CURRENT SCIENCE Volume 84 No. 11, 17 June 2003

**MODERN AGRONOMIC CONCEPTS AND PRACTICES EVIDENT IN
KAUTILYA'S ARTHA-SASTRA (C.300 BC)**

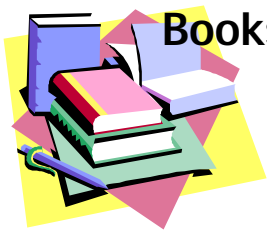
In a recent paper, Dr. Y. L. Nene has made a series of interesting observations regarding agronomic practices mentioned in the Artha-Sastra of Kautilya.

The seeds of grains are to be exposed to mist and heat for seven nights; the seeds of *kosi* (mung bean, black gram, etc.) are treated similarly for three to five nights; the seeds (setts) of sugarcane and the like are plastered at the cut end with the mixture of honey, lard, ghee and cow dung; seeds of bulbous roots with honey and ghee; cotton and hard seeds with cow dung; and pits for trees are to be burnt, and manured with bones and dung of cows on proper occasions.

The practice of exposing seed to dew in the night and drying it under sun during the day is certainly very interesting. Before systemic fungicides became available to farmers in 1960s to control internally seedborne smut diseases in cereals, soaking seed in water to activate fungal mycelia and drying the seed under hot sun to kill these activated mycelia was a recommended practice for wheat seed in northern India to control the loose smut disease. It is possible that the practice mentioned by Kautilya could be leading to activation of fungi and bacteria present on the seed surface or just under the seed coat and then followed by their death on exposure to sun, and thus the seed was freed from potential pathogens. It would be worth conducting experiments to verify this hypothesis.

Excerpts from the full-length paper “Modern Agronomic Concepts and Practices Evident in Kautilya’s Artha-sastra (c.300 BC)” – Y. L. Nene in the Asian Agri-History, Vol VI No.3 pgs 238-239.

Compilation : A.V. Balasubramanian



Books & Educational Materials

ORGANIC COTTON FARMING – by T.P. Rajendran, M.V. Venugopalan and P.P. Tarhalkar, 2000, 40 pp.

This book provides a wide range of information on organic cotton farming. It contains topics dealing with scope of organic cultivation and its merits with a few examples from Maharashtra. The book gives a detailed account on approaches for organic cotton farming, its requirements and various methods of compost preparation. It also touches upon the certification procedures followed in cotton farms and the support provided by the government for organic cultivation.

Price : Rs. 50/-

Available from : Central Institute for Cotton Research, Post Bag No. 2, Shankar Nagar Post, Nagpur – 440 010.

PACKAGE OF PRACTICES FOR ORGANIC COFFEE – by Central Coffee Research Institute, 2000, 43 pp.

This book provides a wide range of information on establishment and maintenance of organic coffee plantations. All the basic necessities for establishing coffee plantation such as selection of site, nursery, land preparation, planting of shade trees, after care of young plantation etc. are dealt with. The steps and precautions to be taken in maintaining the new plantations are also discussed in detail. The book not only provides information for establishing new plantation but also for conversion of established plantations. The common pest and diseases affecting coffee plants are listed with their control measures. Processing of coffee at estate level and factory level is discussed briefly. This book gives details regarding the various eco-friendly and biological methods of pest control.

Price : Not indicated.

Available from : Central Coffee Research Institute, Coffee Research Station, Chikmagalur District 577 117, Karnataka, India.

GUIDELINES FOR PRODUCTION OF ORGANIC COFFEE IN INDIA – by Coffee board, Govt. of India, 2001, 33 pp.

This book provides detailed guidelines for production and processing of organic coffee in India. The first few pages of this book speaks of organic agriculture, its aims and needs in general. This is followed by a detailed account on the various steps to be followed in organic production of coffee. Here, various topics such as farm designing, selection of crops, nutrient management, pest and disease management etc. are discussed in detail. The book provides interesting information on the ingredients, additives and processing methods of coffee. This book also lists the various eco-friendly products and pest control methods that can be followed in organic cultivation.

Price : Not indicated

Available from : Coffee Board, Ministry of Commerce & Industry, Govt. of India, No.1, Dr. Ambedkar Veedhi, Bangalore – 560 001, India.

Website : <http://www.indiacoffee.org>

PERMITTED INPUTS FOR CONTROLLING PESTS AND DISEASES IN ORGANIC COFFEE ESTATES – by Central Coffee Research Institute, 2003, 12 pp.

This booklet lists the eco-friendly inputs for controlling pests and diseases in organic coffee plantations. The booklet provides information on the methods of preparation, mode and method of application of various inputs that are of chemical and biological origin. This booklet would serve as a ready to use guide for organic coffee growers.

Price : Not indicated.

Available from : Central Coffee Research Institute, Coffee Research Station 577 117, Chikmagalur District, Karnataka.

Compilation : T.D. Nirmala Devi

Greening Agriculture in India An Overview of Opportunities and Constraints

There has been a spurt in domestic and international demand for greening agriculture across the countries as a result of initiatives of multiple actors such as institutions / organizations, industrial and trading firms, farming communities, civil society and their representatives. The dynamic role played by these actors has determined the extent of greening of the agricultural production activities in both developing and developed countries. This growing demand for green agriculture products is both a constraint as well as window of opportunity not only for the Indian agriculturists but also for producers, suppliers and traders of agriculture inputs (fertilizer, pesticide etc.) and outputs. Given this outlook, this paper in the first section attempts to understand the current status of the market for agricultural inputs especially for chemical fertilizers and pesticides within India as a background for understanding the greening initiatives in the country contextually. The second section dwells into the agricultural greening initiatives in India by focusing on both the market for green inputs and outputs. It also attempts to analyse the market potential both by looking at domestic and international agriculture market. Finally it evaluates the role played by different agencies in promoting green agriculture market in the country and concludes by incorporating some suggestions so as to improve market potentials for green input and output market. (This review article has been prepared by the Faculty of the Centre for Energy Environment and Technology of the Administrative Staff College of India, Bella Vista, Hyderabad).

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