



TECHNIQUES FOR ORGANIC COTTON CULTIVATION



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Cotton suffers attack of over 40 insect pests. The crop consumes highest share of insecticides and pesticides of the country. Organic cultivation of cotton reduces the use of these hazardous chemicals and enriches the soil nutrients.

Temperature and Humidity

The ideal temperature for cotton cultivation is between 20 – 32° C and 50 – 85% relative humidity.

Soil

Black soil is suitable for rain fed cotton. Irrigated cotton can be cultivated in black soil, red soil and alluvial soil. The pH of the soil should be between 6 – 8.5.

Land Preparation

The land should be ploughed well 6 – 8 times before cotton cultivation. The soil should be like powder after ploughing.

Basal manure

Before the last ploughing farmyard manure (10 tonnes / acre) or good compost (5 tonnes / acre)

or vermicompost (2 tonnes / acre) should be applied on the land. The land should then be ploughed well so that the manure gets thoroughly mixed with the soil.

Biofertilizer application

2 kgs of Azospirillum and 2 kgs of Phospobacteria (for 1 acre) should be mixed with 25 kgs of sand or good compost and applied on the soil before sowing.

Cultivation of Green manure

In irrigated cotton a dense stand of *Sesbania aculeata* (Dhaincha) can be raised around cotton field for a width of 2 meters. It should be cut and spread between cotton rows at 65 – 70 days after sowing. It decomposes fast and provides nitrogen during early boll development. Stalks act as temporary mulch which prevents soil moisture evaporation.

Seeds

The seed rate is 6 kg / acre if it is with lint and 3 kg / acre if the lint is removed. If it is a hybrid variety 1 kg is enough.

Seed treatment

Proper seed treatment procedures should be undertaken. This is essential for drought resistance and also for prevention of seed borne diseases. Seed treatment procedures are described in detail.

Sowing

The seeds should be sown at a depth of 3 cm. If it is an ordinary variety 2 seeds per pit should be sown. For hybrid varieties, one seed per pit is enough.

Gap filling

Sometimes seeds may not germinate in certain pits. The number of plants should be maintained properly. For this, cotton seeds should be sown in soil filled polythene bags on the same day when sowing is undertaken in the field. After 15 – 18 days, saplings which are grown in the polythene bags, should be planted in the field where seeds have not germinated.

Sufficient Gaps

A gap of 75 cms between rows and 30 cms between plants should be provided for ordinary varieties. For hybrid varieties, there should be a gap of 90 cms between rows and 30 cms between plants.

Top dressing

Between 25 – 40 days after sowing 70 – 100 kgs of neem seed cake or 500 kg of vermicompost should be applied as top dressing. The field should then be irrigated.

To prevent dropping of squares, flowers and young bolls



40 – 50 days after sowing squares, flowers and young bolls start appearing. They drop due to a variety of reasons. To prevent this from dropping 3% Panchagavya should be sprayed thrice at an interval of 15 days

each. The first spraying should be undertaken 45 - 50 days after sowing.

Preparation of Panchagavya

Panchagavya is a combination of 5 products obtained from the cow, which is used in traditional medicine extensively. These are cow dung, cow's urine, cow's milk, curd and ghee. A modified prescription of the product is given below.

Materials required

1. Cow dung mixed with water – 500 ml.
2. Cow's urine – 300 ml.
3. Cow's milk – 200 ml.
4. Curd – 200 ml.
5. Ghee – 100 ml.
6. Yellow plantain – 2 nos.
7. Coconut water – 300 ml

Preparation

All the products mentioned above should be put in a mud pot, mixed properly and kept open for 10 days. It should be mixed every day. It is ready for use in 10 days time. 300 ml of panchakavya should be mixed with 9.7 litres of water before spraying.

Nipping the tips

The tip of the plant should be nipped at least 10 cms long. This should be done from top to bottom. For ordinary varieties, this should be done from 75 – 80 days after sowing and for hybrid varieties it should be done between 85 – 90 days. This helps the growth of more side branches and increases the number of fruits.

Trap crops and Border crops

Castor crop should be grown on the borders of the cotton crop. In the field, intercrops which serve as trap crops should be cultivated in the ratio of 5:1 (5 rows of cotton and one row of intercrop). Intercrops trap pests and predators.

Pest and Disease Management

Different pests and diseases affect the crop at different stages. Detailed descriptions and control measures are provided in various posters.

Harvest

A mild breaking in the bolls is observed and 2 – 3 days after this it bursts completely. After this, the cotton is harvested. It is better to harvest before 10 a.m. or after 3.00 p.m. If it is harvested during excessive heat there is a chance for dried twigs getting mixed with good cotton. The harvested cotton should not be placed on mud floor or it should not be dried in the hot sun the whole day. It should be dried in the shade in clean floor.

WHAT DOES OUR PPV-FR* ACT, 2001 SAY ABOUT THE FARMERS RIGHTS?

In a developing country like India where agriculture is the exclusive economic mean and livelihood source for the millions of poor and marginal farmers, the PPV-FR Act, 2001 is a welcome step. The Act has a separate chapter on Farmer's Rights, granting clearly defined rights to Indian farmers.

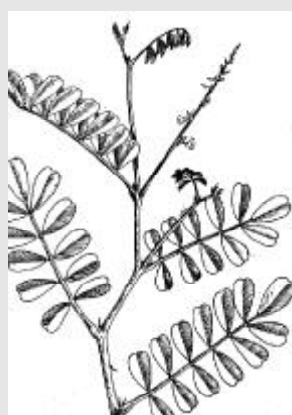
- ◆ A farmer shall be deemed to be entitled to save, sow, resow, exchange, share or sell his farm produce including seed of a variety protected under this Act. Provided that the farmer shall not be entitled to sell branded seed of a variety protected under this Act.
- ◆ A farmer who has bred or developed a new variety shall be entitled for registration and other protection in like manner as a breeder of a variety under this Act.
- ◆ A farmer who is engaged in the conservation of genetic resources of land races and wild relatives of economic plants and their improvement through selection and prevention shall be entitled for recognition and reward from the Gene Fund.
- ◆ Any person or group of persons (whether actively engaged in farming or not) or any governmental or non-governmental organization may, on behalf of local community in India, can make claim attributable to the contribution of the people of that village or local community in the evolution of any variety for the purpose of staking a claim on behalf of such village or local community.
- ◆ Where an essentially derived variety is derived from a farmers' variety, the breeder shall not authorize the variety for commercial purpose except with the consent of the farmers who have made contribution in the preservation or development of such variety.

- ◆ A farmer or a group of farmer shall not be liable to pay any fee in any proceeding before the Authority or Registrar or the Tribunal or the High Court under this Act or the rules made thereunder.
- ◆ A right established under this Act shall not be deemed to be infringed by a farmer who at the time of such infringement was not aware of the existence of such right.

***PPVFR – Protection of Plant Varieties and Farmer's Rights.**

Source : Status of the Rights of Farmers and Plant Breeders in Asia by Ujjwal Kumar and Suman Sahai, 2003

Nitrogen supply from fertility building crops



As part of a major Defra-funded research project 'The development of improved guidance on the use of fertility building crops in organic farming', a comprehensive literature review has been completed. The review covers many aspects of fertility building crops in organic rotations, including how much N is captured, the effects of management practices, subsequent N release after destruction and the modelling approaches used to estimate N fixation.

For further information about the project and full literature,

visit : <http://www.organicsoilfertility.co.uk/home/index.html>

PESTICIDES AFFECT CHILD DEVELOPMENT IN INDIA

A large-scale study has found evidence that children living in regions of intensive pesticide use may be at risk for impaired mental development. Released in April 2004 by Greenpeace India, the study tested a total of 899 children in Indian states where pesticides are used intensively in growing cotton, and compared the results with a nearly equal number of children living where few agricultural pesticides are applied. Researchers evaluated children ages 4 to 5 years and 9 to 13 years, and attempted to match income and social status among the two subject groups. The study reports that in more than two thirds of the tests, children living where pesticides are widely used performed significantly worse.

“Children from regions as diverse as Tamil Nadu and Punjab, who have nothing in common but their exposure to pesticides, [appear to] share an inability to perform simple play-based exercises — such as catching a ball or assembling a jigsaw puzzle — simply because they’ve been exposed to pesticides over a period of time,” says Kavitha Kuruganti, of Greenpeace India.

The researchers noted a significant difference in abilities between the exposed and less-exposed children with trends remaining more or less consistent across different locations and age groups. For example, in Andhra Pradesh, the second highest pesticide using state, less-exposed children performed a physical stamina test for significantly longer periods of time (14.80 seconds longer on average for 4-5 year old children and 64.50 seconds longer for 9-13 year olds). In Tamil Nadu, where cotton production and intensive pesticide use has been common for only five years, exposed children aged 4 to 5 years scored nearly 30 percentage points lower on a 30 minute memory test, while children aged 9-13 scored only 21 points lower than non exposed children.

The findings reinforce an earlier study performed in the Yaqui Valley, a tobacco

growing region of Mexico, which noted dramatic deficits in brain function in rural children with long-term exposure to pesticides. The Greenpeace India study used an assessment tool developed for the Yaqui Valley study, adapted to conditions in India. The assessment involved a series of tests designed for the child to interpret as normal play, involving mental ability, memory, concentration, cognitive skills such as drawing, and balance, fine motor and gross motor coordination.

Researchers pointed out that the study captured the “more insidious effects of pesticides,” reflected in the long term and chronic effects on children’s development. The study concluded, “This is a great cause for concern and alarm since the very basic right to healthy development is being taken away from these children.”

In India, cotton occupies less than five per cent of cultivated land, but represents an estimated 54% of agricultural pesticide use. Organophosphate pesticides, which affect the central nervous system, are the most commonly used class of pesticides used in India. Pesticides such as methyl-parathion and monocrotophos, classified by the World Health Organization as “highly to extremely hazardous to human health” are also produced and used in India. According to the United Nations Food and Agriculture Organization, these highly toxic pesticides are not safe for use in developing countries where access to water, chemical safety training and protective equipment may not be available.

Study authors note that routes of exposure to pesticides for the children in the study areas are both direct and indirect, given the extensive cotton cultivation. Exposures may occur before conception through the impact of pesticides on sperm, in utero, via breastmilk, and through residues in food and water, soil and air. In many of the study villages, dry cotton stalks are

burned for cooking fuel, releasing pesticide residues in smoke.

The study also looked at pesticide alternatives available in India for cotton production, including a new system of crop and pesticide management, Non Pesticidal Management (NPM) as well as organic cotton production and Integrated Pest Management (IPM). At the same time the study noted a lack of government resources for non chemical agricultural production. Greenpeace India offered a number of recommendations for government including; greater support to organic farming (especially for cotton); bans on pesticides restricted in other countries; stronger pesticide regulation and holding the pesticide industry responsible for

damage caused by its products. Greenpeace also called on the pesticide industry to compensate the affected children.

Source : Pesticide Action Network Updates Service, June 22, 2004

*For full report Refer : **ARRESTED DEVELOPMENT-** The impacts of Pesticides on Children's Mental Health and Development. A GREENPEACE study conducted in six states of India in collaboration with : DHARAMITRA, ICRA, SEWA, JANACHETNA, SIRPI, KHETI VIRASAT, SYO & YMC December 2003.*

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

KARNATAKA GOVERNMENT SUPPORTS ORGANIC FARMING

The Karnataka Government has recently released its state policy on organic farming for the year 2004. This has been released by the Commissionerate of Agriculture. It is interesting to note that for the first time a state government has brought out a clear statement on its organic farming policy. The 26 page report clearly spells out the need for organic farming, the status of organic farming in the state and the strategies for promotion of organic farming in the state. The functions and responsibilities of the state level empowered committee for promotion of organic farming in the state and also the functions and responsibilities of the mini mission on organic farming is outlined. Strategies to involve Krishika Samaj in promotion of organic farming, self help groups, farmers cooperatives are also outlined.

The functions and responsibilities of the mini mission on organic farming has been outlined as below :

1. To formulate operational guidelines for promotion of organic farming in the state.
2. To screen and appraise State Level Empowered Committee on various projects / schemes.

3. To prepare annual plans and action plans with budgetary allocations for different sectors and put up for the approval of the Empowered Committee.
4. To suggest components of subsidy/ assistance for promotion of organic farming.
5. To formulate quality control guidelines involved in production and marketing of organic inputs, establishment of quality control laboratories for detection of pesticide, nitrate and heavy metal residues.
6. To co-ordinate with NGO's farmers organizations, processing industries, marketing agencies, export organizations, certification agencies in promotion of organic farming in the state.
7. To draw action plans in relation to transfer of technologies on organic farming, organic certification, quality control of organic inputs and related matters.
8. Any other tasks assigned by State Level Empowered Committee from time to time for promotion of organic farming.
9. Committee would meet at least once in two months.

WHO CLASSIFICATION OF PESTICIDES USED BY SURVEYED FARMERS

Extremely Hazardous Class I a		Highly hazardous Class I b	
Parathion	OP	Demeton-S-methyl	OP
Parathion Methyl	OP	Monocrotophos	OP
Phosphamidon	OP	Triazophos	OP
Moderately Hazardous Class II			
Chlorpyriphos	OP	Cypermethrin	Synthetic Pyrethroid
DDT	Organochlorine	Dimethoate	OP
Endosulfan	Organochlorine	Ethion	OP
Fenvalerate	Synthetic Pyrethroid	Lambdacyhalothrin	Synthetic Pyrethroid
Phosalone	OP	Phosmet	OP
Profenofos	OP	Quinalphos	OP

According to a study conducted in Guntur district of Andhra Pradesh (the state of AP consumes the highest amount of pesticides, and the district of Guntur the highest within the state), farmers were using a range of 22 insecticides, many of which are highly hazardous under the usual conditions of use, and require observation of a number of days before re-entry into the field.

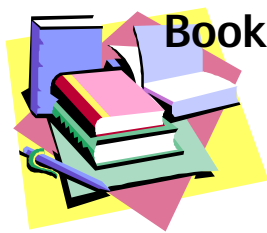
Source : Arrested Development, the Greenpeace Study (refer previous page)

Traditional Pest Control Practices among Urali Tribal Community

Tribal people of the Urali Community, mix ash with grains and other seeds like pea, grams, etc., to preserve them. The ash-mixed seeds are then wrapped in leaves of *Clerodendrum infortunatum*, which can then be stored for one year. Since ash absorbs moisture and therefore controls fungal growth, it is widely used for storing grains. *Clerodendrum infortunatum* is bitter in taste and even emits a disagreeable odour, which may help in controlling pests.

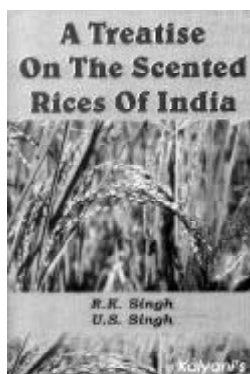
For higher production of *mathan* (a cucumber-like vegetable creeper), a small cleavage is made in the stem and mustard grains are kept in it.

Source : Honey Bee Vol. 14(4) December 2003 and 15 (1) March 2004



Books & Educational Materials

A Treatise on the Scented Rices of India - Dr. Ram Kathin Singh & Dr. Uma Shankar Singh



Basmati, the scented rice of India falls into two main categories, the long grain and short grain types. Though it's centre of origin is India, it was the Americans who first patented the Basmati as Texmati rice. This book gives a list of 143

indigenous aromatic rice varieties found in different states of India. It has also been spiced with details of released hybrids, crop improvement, crop husbandry, pests and diseases, IPM (organic and chemical modules), trade, factors pertaining to it's growth and a gist of quality characters that need to be checked before selecting a variety for breeding programmes. It also gives us information regarding important centres which work on genetic enhancement, research and seed testing. Furthermore it also outlines those indigenous varieties that has been used as donors in breeding programmes.

Price: Rs. 295.00

Published by : Kalyani Publishers, B-1 / 1292, Rajinder Nagar, Ludhiana – 141 008

Seed Quest-A journey through space and time



“Seed” has been the lifeline and basic source of sustenance for agriculture. This book highlights the importance of seed conservation and the role of seed conservation banks. It speaks about the success

stories of 34 seed banks formed in various agro-climatic zones of Karnataka. These seed banks conserve about 360 varieties of millets, cereals, oilseeds, pulses, fibre crops, vegetables, spices etc. The background information about the state, its soil types and the agro-climatic zones gives a better understanding. The past history and the present status of each climatic zone are provided are given in detail. It also speaks about the influence of agricultural technologies in the lives of the people and the changing trends in the agricultural scenario of the state. The characteristic features of each variety is dealt individually. The book also touches upon the various acts dealing with the farmer's rights and agro-diversity.

Price : Not indicated.

Available from: Green foundation, No.570/ 1, Padmashri Nilaya, 3rd Main, 4th Cross, N.S.Palya, BTM 2nd stage, Bangalore 560076. Ph: 080-2678 4509

What is Organic Agriculture?

Organic agriculture includes all agricultural systems that promote environmentally, socially and economically sound production of food and fibers. Recycling nutrients and strengthening natural processes helps to maintain soil fertility and ensure successful production. Pests and diseases are controlled with naturally occurring means and substances according to both traditional as well as modern scientific knowledge. Organic agriculture excludes synthetic fertilizers and pesticides, and genetically modified organisms are excluded.



EXAMPLES OF THE SUCCESS OF ORGANIC AGRICULTURE



India : The Maikaal organic cotton project

More than 1000 households are participating in an organic cotton project that has resulted in substantially higher yields of cotton, wheat, soy, chilli and sugarcane, lower production and labour costs, lower irrigation requirements, improved soil structure, and absence of major pest problems.

Madagascar : System of Rice Intensification (SRI)

The SRI, introduced in 1990, has improved rice yields from some 2 t/ha to 5, 10 or even 15 t/ha on farmers' fields, without the use of purchased pesticides or fertilizers. It is being tested throughout Asia and elsewhere, in all cases increasing rice yields substantially.

Peru : Revitalising indigenous knowledge

A recently revived ancient system of raised fields surrounded by ditches filled with water for high-altitude production, now produces potato yields of 8 - 14 t/ha without chemical

fertilisers, compared with the regional average of 1 - 4 t/ha.

Senegal : Improving quality of soils

Since 1987, the Rodale Institute Regenerative Agriculture Research Centre has worked on a diversified approach involving stall-fed livestock, legumes and green manures, improved use of manures and rock phosphate, water harvesting, and composting. Yields of millet and groundnut have increased several times, with less annual variability.

Mexico : ISMAM fair-trade coffee

By adopting organic techniques and improving quality, the ISMAM co-operative of smallholder coffee growers was able to overcome soil degradation and low yields and move into a privileged speciality market (fair trade) that rewarded their extra efforts toward ecologically sound production.

Source : Organic Agriculture and Food Security Leaflet Produced By IFOAM, Jan. 2004

Editorial Team : T.D. Nirmala Devi, Dr. K. Vijayalakshmi

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