Indigenous Agriculture News
Incorporating Pesticide Post
Vol. 4
No. 5 & 6
Nov. 04 & Jan. 05

TECHNIQUES FOR ORGANIC PADDY CULTIVATION

IN THIS ISSUE

Neem for locust control in Senegal 4

Indigenous Ragi Varieties 5

Books & Educational Material 7

Rice, which is being cultivated for several years in our country is not just a grain. It is the lifeline. It is the second most important crop next to wheat. India is one among the leading producer of rice in Asia. But even today a major portion of our rice is produced chemically. There are several problems associated with chemical farming. The chemicals pollute the environment and cause serious health hazards. Pesticides used on the crops are known to kill around 14,000 people every year and more than 7,50,000 people are poisoned by it. Organic farming can be the only permanent solution for these problems.

A summary of the techniques that are to be followed in organic cultivation of paddy is given below :

Soil type

Alluvial Soil, Sandy clay and Clayey soil types are suitable for paddy cultivation

Seed Rate

The seed rate required for one acre of land under irrigated condition is given below.

- Short duration variety (90-110 days) - 24-28 kg
- Medium duration variety (110-125 days) - 16-24 kg
- Long duration variety (above 125 days) - 12-24 kg
- SRI (System of Rice Intensification Method) or Madagaskar method - 2–3 kg
- Dry and rain fed sowing - 35-40 kg

Separation of Good Quality Seeds

- When the seeds are soaked in water, the unviable seeds will float on the surface of the water. These seeds can be removed and the seeds that sink into the water can be used for cultivation. By this method, the damaged seeds can be removed easily.

- Take some water in a vessel and drop an egg in it. Keep adding salt to it slowly until the egg reaches the surface of the water. When the seeds are dropped in this water, the good quality seeds will sink into the water. Remove the unviable seeds that float on the surface of the water. Wash the selected seeds in good water for 2-3 times to remove the salt deposits. If this is not done, the germination capacity of the seeds will be affected. By this method, the unviable seeds can be removed completely. This method should be followed when there is more of chaff.

Seet Treatment

Seed treatment using Cow's urine : Dilute 500 ml of cow's urine in 2½ litres of water. Tie the seeds to be sown in small bags and soak them in cow's urine extract for half an hour. Shade dry the seeds before sowing.

Seed treatment using Sweet flag extract : Powder 500 g of sweet flag rhizome and dilute it in 2½

litres of water. This is the quantity required for treating seeds to be sown in one acre. Tie the seeds in small bags and soak them in this extract for half an hour. Dry the seeds in shade before sowing.

Seed treatment with Pseudomonas : 250 g of the fungus pseudomonas should be mixed with one litre of cooled rice gruel. The sprouted seeds required for one acre should be spread on a cement floor. Pseudomonas extract should be sprinkled all over the seeds and mixed well.

Preparation of Nursery

6-8 cents of nursery is required for cultivating in one acre of land. The land should be ploughed 6-8 times and neem leaves should be applied as basal manure. For high yielding varieties, 1 kg of neem cake should be applied per cent of nursery. Then, the sprouted seeds should be strewn in the nursery. 15-25 kg of gypsum should be applied to the nursery before plucking the seedlings to avoid any damage caused to the roots.

Preparation of Main Field

Green manure seeds should be sown on the main field. The green manure plants should be ploughed into the soil when they are 45-60 days old. The main field should be ploughed well for 6-8 times and levelled.

Basal Manure

i) Farmyard manure - 5-7 tonnes/acre

ii) Poultry waste - 2 tonnes/acre

iii) Vermicompost - 2 tonnes/acre

Any one of the above mentioned manure should be applied during the last ploughing.

iv) 40-50 kg of neem cake should be applied as a basal manure.

v) 10% Amirthakaraisal should be sprayed before transplanting. Otherwise for 1 acre of land, 300-500 litres of Amirthakaraisal should be mixed with water and irrigated.

Preparation of Amirthakaraisal

Fresh cow dung – 10 kg

Cow's urine – 10 litres

Jaggery - 1 kg

Water – 100 litres

The above mentioned ingredients should be added to a cement tank and mixed well. The extract would be ready for use the next day. It improves the soil fertility and gives good yield.

Application of biofertilisers

2 kg of Azospirillum or 2 kg of phosphobacteria should be mixed with 25 kg of sand or compost and strewn on the field.

Transplantation

- 2-3 seedlings should be planted per hill.
- For SRI method, only one seedling should be planted per hill.

Spacing

Short duration variety	-	15 x 10 cm
Medium duration variety	-	20 x 10 cm
Long duration variety	-	20 x 15 cm
SRI Technique	-	25 x 25 cm

Growing of Azolla or Blue Green Algae

Azolla or Blue Green Algae should be strewn on the field 5-10 days after transplanting. After 25 days and 45-50 days of strewing, the field should be drained and the algae should be stamped into the soil.

Top Dressing

After weeding, 25 kg of neem cake or groundnut cake should be applied as top dressing. 50-75 kg of vermicompost or 50 kg of bone meal can be applied as top dressing. For medium and long duration varieties, 25 kg of ground nut cake should be applied as top dressing after 50-60 days of transplantation.

Spraying of Panchakavya

Panchakavya is a growth promoter produced with the combination of five products obtained from the cow along with few other bioproducts.

Method of Preparation

Cow dung	- 5 kg
Cow's urine	- 3 litres
Ghee	- 1 litre
Cow's Milk	- 2 litres
Curd	- 2 litres
Tender coconut	- 3 litres
Cane juice or jaggery	- 3 litres (or) 1kg
Yellow plantain	- 12 nos (or) honey ½ kg

Add cow dung, cow's urine and ghee in a mud or cement tank of 30-litre capacity. Stir this well in morning and evening for a week. The methane gas gets released from this. To this mixture, add milk, curd, tender coconut, yellow plantain (ripe) and jaggery. After a week's time, this extract can be filtered and used.

- For coarse varieties, one spray of 3% panchakavya should be given during tillering and bootling stage.
- For fine varieties, one spray of 3% panchakavya should be given during the bootling stage.

Spray of Tender Coconut and Buttermilk Extract

To maintain uniform flowering, one spray of 10% buttermilk extract or 3% tender coconut should be given during the bootling stage.

Pest, Disease Management

Pests such as stem borer, brown plant hopper, green leaf hopper, ear head bug and diseases such as blast, brown plant hopper and tungro virus have challenged our farmers to a great extent. It is highly essential to control them at early stages inorder to avoid heavy loss.

Some of the non chemical practices to control pests and diseases are given below:

Keeping Neem cake bags in Irrigation Canals

The gunny bags should be filled with neem cake and placed along the water canals. Neem cake gets dissolved in the water flowing along the canals and irrigates the field. This practice prevents attack of pests and diseases affecting the roots and tillers of the crop. The bags should be replaced once in 15 days. This should be kept until the crop attains the milky stage.

Use of Plants with Pest Repellent Properties

Neem cake / Neem leaves, *Vitex* leaves, *Morinda* leaves, *Calotropis* leaves and *Jatropha* leaves are used for this purpose. Any two of the above mentioned leaves are taken and pound well. The pound leaves are taken in a mud pot and thrice the quantity of water is added to it. The mouth of the pot is tied with a cloth and left as such for three days. Then, these pots are placed on all the four corners of the field. In the evening, the mouth of the pots should be opened and stirred well. The unpleasant odour which emanates from this pot prevents the entry of pests into the field.

Neem seed kernel extract

3–5 kg of Neem kernel is required for an acre. Remove the outer seed coat and use only the kernel. If the seeds are fresh, 3 kg of kernel is sufficient. If the seeds are old, 5 kg is required. Pound the kernel gently and place it in an earthen pot. To this, add 10 litres of water. Tie the mouth of the pot securely with a cloth. Leave it as such for 3 days. Filter it after 3 days. On filtering 6-7 litres of extract can be obtained. The shelf life of this is about one month. 500–1000 ml of this extract is used for one tank (a tank of 10 litre capacity). 500-1000 ml of extract should be diluted with 9½ or 9 litres of water before spraying. Khadi soap solution @ 10 ml/litre (100 ml/tank) should be added to help the extract stick well to the leaf surface. The concentration of the extract can be increased or decreased depending on the intensity of the pest attack. It controls sap feeders and all kinds of larvae.

Note : This extract can be stored for a period of one month. The seeds used for preparing this extract should be at least 3 months old.

Kashayam Preparation

The plants selected for kashayam preparation should be collected without the roots. The plants should be cut into small pieces and used. For one acre of crop, 2 kg of the cut plants should be mixed with 8 litres of water. This has to be taken in a wide mouthed vessel and boiled until the extract reduces to 2 litres. This has to be cooled and filtered. 300 ml of this extract should be diluted with 100 ml of soap solution and 9.4 litres of water to obtain one tank capacity of the extract.

Plants used in kashayam preparations - Pests and diseases controlled

Andrographis paniculata - All kinds of larvae

Sida spinosa - Aphids and Sap feeders

Adhatoda zeylanica - Fungal diseases

Panchathiktha kashayam* - All kinds of pests

* Panchathiktha kashayam is prepared by using equal quantities of five types of bitter leaves.

Preparation of Khadi Soap Solution

Khadi soap solution should be added with all neem extracts before spraying. This is a neem based soap without any detergent. It should be soaked overnight in water and used. The soap solution should be sticky and thick in nature.

Water Management

Paddy crop requires continuous irrigation. At least one-inch level of water should stagnate in the field.

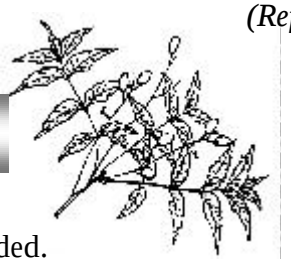
Harvest

The grains should be harvested once they turn yellow.

Source : Organic Paddy Cultivation

(Refer page 7)

USE OF NEEM LEAF SPRAY IN SENEGAL



Mr. Tony Cisse who has a small farm of approximately 3 hectares in the village of Sebikotane, Region de Cap Vert, Senegal has tested neem leaf extract biopesticide against the desert locust in senegal, West Africa. This report is based on the personal experience of Mr. Tony Cisse.

His farm is focussed on fruit production with some mature mandarins, mangoes and papaya trees, and a large number of young saplings (mango, orange, mandarin etc.) and some vegetables (chilli, pepper, garden egg, melon, cucumber etc).

Senegal is currently in the midst of the worst locust invasion for 15 years. Government agencies and the army are struggling to control the situation.

Mr. Cisse happened to come across the information produced by CIKS in relation to the use of the Neem cake (which grows in abundance in Senegal) in the control of farm pests and in particular locusts. Mr. Cisse had experimented the neem extract against locust infestation. He had previously used chemicals against pests such as caterpillars and other leaf miners. But, never succeeded in eradicating them.

Preparation of Neem Leaf Solution

The solution was prepared by soaking 1 kg of neem leaves in 5 litres of water. The solution was left over night and then filtered through a cloth. The solution was taken in a backpack sprayer and a little amount of cotol (washing up liquid) was added.

The solution was added two days prior to the arrival of locusts.

Effect on Locusts

For the first 6 days, the crops were consistently attacked by migrating locusts. Initially they were controlled using burning car tyres but when the infestation got severe neem solution was sprayed over the crops and directly on the locusts.

After the spray, there was no damage caused to the plants by the locusts. The locusts that came in direct contact with the spray became very slow and were unable to fly any distance. They were able to prevent significant number of locusts in the next 6 days. On inspection, they found a number of dead but undamaged locusts in the farm.

Conclusion

Whilst they were not engaged in any scientific studies, they used neem solution as the primary method of defence against locusts, and therefore any conclusion is anecdotal. It appears that neem sprayed on crops had a deterrent effect on the locusts in eating the plants. The spray also had the effect of making it relatively easy to eliminate many of the locusts. The other farmers who did not use neem made attempts to drive away the locust by generating noise and by burning car tyres.

Source: Based on the report sent to CIKS by Mr.Tony Cisse.

CHARACTERISTICS OF SOME INDIGENOUS FINGER MILLET VARIETIES

Finger millet (*Eleusine coracana*) is a popular staple crop in many parts of India. This millet has several eco-region species and local names. Farmers have identified different varieties of this crop on the basis of their morphological structures such as ear head, grain and straw colour.

Finger millet is a short, profuesely tillering plant with characteristic of finger like terminal inflorescence, bearing small reddish seeds. Depending on the variety and growing conditions, the maturity of the crop varies from 3-6 months. The crop is adapted to a fairly reliable rainfall conditions and has an extensive but shallow root system.

Uses : The grain is used in the preparation of food items such as ragi dosa, ragi balls, pancake, vermicelli, malt, biscuit, beer, papads, millet mix, bread, roti etc. The husk of ragi is used in underground grain storage, packing, pillows and cushions, scare crow and in fomentation for pain relief. The ragi straw is used as bed for postnatal care of young mothers and fodder for live stock and in ethnoveterinary to cure pneumonia. The peduncle of ragi is used as a nutritive fodder for sheep during breeding and milching cows. The juice of the peduncle is taken to prevent poisonous effect of scorpion / centipede bites.

1. Chendoo Hoovu Ragi

Season	:	Kharif
Duration	:	3.5 Months
Significant Feature	:	A Wetland variety, it is water intensive and is resistant to pest and disease attack.
Yield	:	Good
Description	:	Earheads are compact and closed and are hence identified with mari gold flowers. Has moderate fodder yield.

2. Beli Ragi

Season	:	Kharif / Summer
Duration	:	4 Months
Significant Feature	:	Good yielding variety
Yield	:	Good
Description	:	It provides good quality of fodder and grain suited to both wet and dryland. Earheads are long and white in colour. Good tillering variety.

3. Tidalu

Season	:	Kharif / Summer
Duration	:	4 Months
Significant Feature	:	Suited to both dry and wet land
Yield	:	Good
Description	:	Short duration variety with medium height and good yield. It has good pest and disease resistance. Earheads are small and compact.

4. Madayyana Giri Ragi

Season	:	Kharif
Duration	:	3 Months
Significant Feature	:	Grows tall, food quality is good
Yield	:	Moderate
Description	:	This is an old and rare variety of old Mysore region. Earheads are violet, open and long. It is the best suited variety for rainfed dry lands. Vulnerable to neck and finger blast disease.

5. Uganda Ragi (3624)

Season	:	Kharif
Duration	:	4.5 Months
Significant Feature	:	Good resistance to neck and finger blast disease
Yield	:	Good
Description	:	Variety suited to areas receiving less rain fall. It has compact and medium sized attractive violet earheads. Good resistance to drought. This variety contains less quantity of husk.

6. Gidda Ragi

Season	:	Kharif
Duration	:	4.5 Months
Significant Feature	:	Good resistance to drought and pests
Yield	:	Good
Description	:	Except for the size of the earhead which is small, it can be compared to kari kaddi ragi.

7. Kari Bunduga

Season	:	Kharif
Duration	:	4 Months
Significant Feature	:	Good yielding variety
Yield	:	Good
Description	:	Attractive violet colour earheads are close and compact. It has a black colour ring at the leaves and stem joints. Good in fodder and grain yield.

8. Iyyana Ragi

Season	:	Kharif
Duration	:	5 Months
Significant Feature	:	Highly drought resistant
Yield	:	Moderate
Description	:	Famous in old Mysore area, but is gradually being eroded, suited to rainfed dry lands. Grows tall and provides good quality and quantity of fodder. Earheads are open and long. Vulnerable to neck blast.

Source : Celebrating the Cultural and Ecological Roots of Ragi, Green Foundation, Bangalore.

Books & Educational Materials

No Pesticides... No Pests...

Documented by : G.V. Ramanjaneyulu, Kavitha Kurunganti, Zakir Hussain and Venu Madhav

This booklet entitled "No Pesticides No pests" highlights the importance of organic cotton cultivation and its impact on the environment. This book narrates the remarkable story of how a village in Andhra Pradesh got rid of pesticides completely. The case study of Punukula, a village completely free of pesticides and pests is very interesting and would encourage more number of farmers to take up organic cotton farming. It also provides information on the various IPM techniques adopted by the farmers and data on pesticides usage in India.

Published by : Centre for Sustainable Agriculture, Secunderabad-500017, India.

Organic Farming - A potential solution for farmers engaged in cotton cultivation

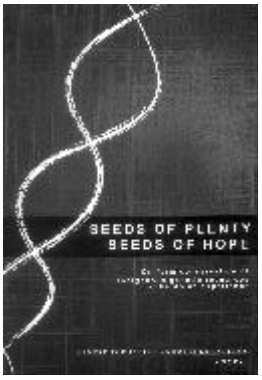
This booklet has been produced by Oxfam based on the proceeding of the workshop held at Warangal on "Organic Farming-A potential solution for farmers engaged in cotton cultivation". The booklet deals with various aspects of organic cotton farming such as the current scenario, problems involved and the future prospects. The techniques for organic cotton cultivation and the standards for organic cotton certification have also been discussed. The experiences of people from various sectors and various parts of the country have also been shared.

Copies can be had from Oxfam GB in India, Plot No. 18, Amaravathi Cooperative Housing Society, Near Kausalya Estates, Kharkhana, Secunderabad - 500 009, AP.

Seeds of Plenty Seeds of Hope

On-farm conservation of indigenous genetic resources – the Asian Experience

K.Vijayalakshmi & A.V. Balasubramanian (eds)



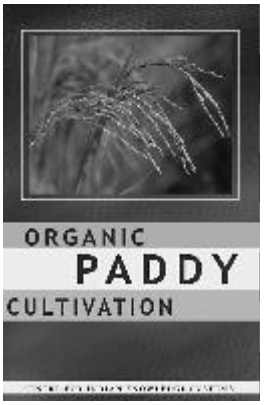
A large number of grass root efforts are in progress for the on-farm conservation of indigenous genetic resources. This book attempts to capture these efforts that have been in progress in Asia. The coverage of the groups involved in this effort is by no means exhaustive and must only be considered as representative of this effort. It is meant to promote sharing and exchange of information as well as materials wherever desirable and feasible and also lead to the formation of networks and coalitions in this important area of work.

Price : Rs. 200/-

Published by : CIKS, Chennai.

Organic Paddy Cultivation

K. Vijayalakshmi, T.D. Nirmala Devi, Subhashini Sridhar & S. Arumugasamy



This book provides detailed information on organic paddy cultivation. It provides information about seed selection techniques, seed treatment and use of organic manures to improve soil fertility. Pests and diseases affecting paddy are described in detail with their organic control measures. It also gives information on the pests attacking stored grains and their control. The latter portion of this book provides information about important indigenous paddy varieties with their special characteristics. Photographic illustrations of major pests and predators help in easy identification. Control measures are also illustrated in colour.

Price : Rs. 125/- (English) Rs. 100/- (Tamil)

Published by : CIKS, Chennai.

THANKS FOR YOUR SUPPORT

With this issue we would be completing four years of publishing "Indigenous Agriculture News". Before we started bringing out this newsletter in the name of Indigenous Agriculture News it was published as "Pesticide Post" starting from the year 1992. We are happy to have been able to interact with you for the last 13 years. We had an internal assessment of this newsletter in our centre. After extensive discussions we have decided to discontinue publication of this newsletter for a variety of administrative reasons. We would like to send you any publication of your choice for the subscription amount remaining with us. You would be getting separate letters with the subscription amount remaining and also a catalogue of our publications. In case you decide to get back your subscription amount we would be happy to send it back to you. We once again wish to thank you for all the support extended and hope you would extend your support to our publications in future.

- Dr. K. Vijayalakshmi
Editor

Editorial Team : *T.D. Nirmala Devi, Dr. K. Vijayalakshmi* ***Typesetting :*** *S. Ramesh*

To **Book-Post**

Centre for Indian Knowledge Systems
Real-world solutions from traditional science.
30, Gandhi Mandapam Road, Kotturpuram, Chennai - 600 085. INDIA
Phone : 91-044-24471087 / 24475862 Fax : 91-044-24471114
E-mail : ciks@vsnl.com http://www.ciks.org