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CERTIFICATION COURSES

# Organic Farming for Sustainable Agricultural Production

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**Lecture 25 : Organic Field Crop Management (Cereals contd.)**

## NUTRIENTS MANAGEMENT

Chemical Properties	Conventional VC (%)	Microbial Enriched VC (%)	Rock enriched VC (%)	FYM
Total N	1.3-1.5	1.8-2.4	1.4-1.5	0.5
Total P	0.8-1.0	0.9-1.3	2.9-3.5	0.2
Total K	1.0-1.1	1.1-1.60	2.8-3.5	0.5

SOURCE	DOSE, Based on N content
Conventional VC	7 tonnes/ha.
Microbial Enriched VC	4 tonnes/ha
Rock enriched VC	7 tonnes/ha
FYM	20 tonnes/ha
Chemical fertilizer	100-50-60 kg of N:P <sub>2</sub> O <sub>5</sub> :K <sub>2</sub> O

# Pest and Disease Management

## 1. General precautions:

- Select the resistant and well adopted varieties for specific areas.
- Select the clean and diseased free seeds.
- Proper agronomical practices like optimum planting time and seedling age, planting geometry, depth of planting, etc.
- Good water management for example at the time of attack of insects and diseases, water should be drained out.

## 2. Field preparation:

- Apply FYM pre-colonized with *Trichoderma harzianum* (TH) or *Pseudomonas fluorescens* (PsF).
- For the precolonization of FYM, TH/PsF is to be added at monthly interval in FYM pits @ 100 g/pit. These pits should be covered with sugarcane leaves or rice straw. Water should be sprayed at regular intervals (at least once after bioagent application) to maintain moisture.
- In green manuring, spray *Trichoderma harzianum* and *Pseudomonas fluorescens* @ 5g/litre of water just at the time of incorporation of green manure crop.

### 3. Nursery sowing time:

- Seed treatment with salted water followed by *Trichoderma harzianum* and *Pseudomonas fluorescens* (PsF) @ 5 g each /kg seed .
- Use one pheromone trap for stem borer per 100 m<sup>2</sup> nursery area.
- Release *Trichogramma japonicum* or *T. chilonis* @150000 parasitoids/ha.

### 4. Transplanting:

- Drenching of PsF (1 g/ m<sup>2</sup>) in nursery soil one day before uprooting of seedlings or dipping of roots of seedlings in suspension of PsF (5g/l).

## 5. After transplanting till maturity

- Use **pheromone traps** (5 mg pheromone per trap; 20 traps/ha; 20 m x 25 m distance) within a week of transplanting for stem borer and replace lure after 30 days.
- **Avoid water stagnation** and at the time of attack of insects and diseases.
- **Spray 10% cow urine mixed with neem leaves**. The spray of cow urine should be started 25 days after transplanting and subsequently 3-4 spray at 15 days interval.
- Spray **5% vermiwash/compost tea treated with *Trichoderma harzianum* and *Pseudomonas fluorescens***
- Spray mixed formulation of compatible strains of ***Pseudomonas fluorescens* and *Trichoderma harzianum* (5g each per liter of water)** at panicle initiation for sheath blight, sheath rot & neck blast. One spray to be given at weekly interval.

# Wheat (*Triticum aestivum*)

**Family:** Poaceae

## Climatic Requirements

- Wheat is cool season crop.
- Average temperature during sowing: 10°C to 15°C , ripening or grain filling: 21°C to 26°C.
- Wheat grows better in those areas where rainfall occurs in winter. Irrigation serves the best if rainfall falls below 50 cm.
- **Soil**
- Wheat grows best in well drained fertile loams of either alluvial soils type or black soils type.
- Optimum pH range is 6.0 to 7.0.

## Land preparation and sowing:

- Primary tillage followed by secondary tillage to loose soil for sowing of seed. If needed irrigation can be provided to have proper moisture content for the tillage operation
- Seeds sown in rows of 20 cm spacing
- Sow one row Sarson on all four sides of the field. This will serve as 'Trap Crops' for some insect-pests.

## NUTRIENTS MANAGEMENT

Chemical Properties	Conventional VC (%)	Microbial Enriched VC (%)	Rock enriched VC (%)	FYM
Total N	1.3-1.5	1.8-2.4	1.4-1.5	0.5
Total P	0.8-1.0	0.9-1.3	2.9-3.5	0.2
Total K	1.0-1.1	1.1-1.60	2.8-3.5	0.5

SOURCE	DOSE, Based on N content
Conventional VC	8 tonnes/ha.
Microbial Enriched VC	5 tonnes/ha
Rock enriched VC	8 tonnes/ha
FYM	24 tonnes/ha
Chemical fertilizer	120-50-60 kg of N:P <sub>2</sub> O <sub>5</sub> :K <sub>2</sub> O



# Pest and Disease Management

## Aphids

Aphid populations are usually kept in check by

- biological control agents, such as lady beetles, parasitic wasps, syrphid fly maggots, and fungal pathogens, which are often abundant in small grains.

## Armyworm

- Spray Pyrethrum (20 g in 10 litre water) in 10 days interval



Aphids on Wheat



Armyworm





## Loose smut

- Certified seed fields are inspected for loose smut, and strict standards are enforced.
- Seed from fields with loose smut are rejected. So using certified seed is a highly effective way to avoid loose smut.

- **Leaf rust**

Organic producers must select varieties with good resistance to leaf rust

- select varieties that have a combination of powdery mildew and leaf rust resistance.



Loose smut



Leaf rust

## Quality

- There was no difference in amylose and protein contents between organically grown and ordinarily grown rice. The superoxide dismutase (SOD) activities of methanol extracts from organically grown rice were higher than those of ordinarily grown rice (Gi-Soo et al., 2007).
- Organic nutrient sources can perform comparatively well as regards chemical and physico-chemical properties, and cooking quality of rice, if not better in some parameters than inorganic fertilization (Saha et al., 2007).
- High wheat quality in organic farming is achievable by lower inputs, thereby safeguarding natural resources ([Mäder](#) et al., 2007)

Gi-Soo Na,; Lee, Si-Kyung; Kim, Soo-Young. 2007. **Antioxidative Effects and Quality Characteristics of the Rice Cultivated by Organic Farming and Ordinary Farming.** [Applied Biological Chemistry](#), **50** (1): 36-41

Saha Supradip, A. K. Pandey, K. A. Gopinath, R. Bhattacharaya, S. Kundu, H. S. Gupta. 2007. Nutritional quality of organic rice grown on organic composts. [Agronomy for Sustainable Development](#), 27 (3): 223–229

[Paul Mäder et al. 2007.](#) **Wheat quality in organic and conventional farming: results of a 21 year field experiment.**, Journal of the Science of Food and Agriculture. <https://doi.org/10.1002/jsfa.2866>