

Package of Practices for Organic Production of Crops and Cropping Systems

ICAR-Network Project Organic Farming



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JHARKHAND

Suggested cropping systems (based on testing under NPOF)

1. Rice (basmati type)-wheat
2. Rice (basmati type)-lentil
3. Rice (basmati type)-linseed
4. Rice (basmati type)-potato

Rice (*Kharif*)

Particulars	<i>Kharif</i>
Crop	Rice
Fortnight of sowing/planting	Transplanting in 1 st fortnight of July
Fortnight of harvesting	1 st fortnight of Nov.
Varieties suitable for organic farming	Birsamati

Important features of suitable varieties

Parameters	Birsamati
Duration (days)	125-135 (Medium)
Average yield under organic condition (kg/ha)	3000-3500 kg/ha
Source (s) of availability	AICRP on RiceBAU, Ranchi.
Suitable regions/districts in the state	All district/Jharkhand
Specific resistance / tolerance to pest	Gall midge
Specific resistance / tolerance to disease	Bacterial leaf and sheath blight

Nursery raising practices

Area of nursery required for 1 ha	1000m ²
Nursery raising method	Dry nursery





Bed size (length × breadth in m)	1 × 10m ²		
Seed sowing rate/m ²	35 kg/ha		
Pre-sowing seed/soil treatment	Materials	Quantity/kg of seed or per m ² area	Method of application
	Pseudomonas fluorescence	5g/kg of seed	For seed dressing metal seed dresser / earthenpots or polythene bags are used
Source and optimum quantity of organic manures/other nutrient source/m ² of nursery	Materials	Quantity/ m ² area	Method of application
	FYM	1/2 kg	Soil application at the time of nursery preparation 10-15 days prior to sowing.
	Vermicompost	1/4 kg	Applied along with soil after sowing to cover the seeds.
Irrigation practices	As and when needed		
Weed management	1 Hand weeding		
Organic plant protection practices	Name of pest/ disease	Recommended organic material used for control	Quantity/ m ² area
	Wilt, Blast, Blight	Nisarga/Monitor/ Biosanjeevni (Trichoderma viride)	Seed- 5 g/litter/kg
Optimum age of nursery (days)	25-30 days		

Field preparation: The field was ploughed twice 15 days before transplanting the puddling of the soil was done two days prior to transplanting. The green manure crop dhaincha can be grown at seed rate of 40 kg/ha in May month with application of 250 kg/ha of rock phosphate. The dhaincha crop has to be incorporated at 40-45 DAS at 15 days prior to rice transplanting. This will able to meet out the 25-30 kg/ha of nitrogen requirement of paddy crop.





Cultural practices

Spacing (Row X plant) in cm	20x10 cm		
Number of seedlings/hill	2 seedlings/hill		
Basal application of organic manures including soil application of bio-fertilizers, bio-control agents etc	Source	Quantity (q/ha)	
	FYM	53.28	
	Karanj cake	6.66	
Top dressing of organic manures	Source	Quantity (q/ha)	
	Azolla	1 kg/m ²	
	Vermicompost	26.66	Days after sowing/ planting or stage of crop
Irrigation practices	Panchagavya	15 DAT	
		10-12 lit/ha mixed in 500-600 litre of water	
	Number of irrigations	Most critical stages for irrigation	Depth of irrigation (cm)
	Need based	Tiller initiation, flowering and milky stage	3-5 cm standing water
Major weeds	Local Name	English Name	Scientific Name
	Motha	Nut sedge	<i>Cyperus difformis</i>
	Dub ghas	Couch grass	<i>Cynodon dactylon</i>
	Sawa	Water grass	<i>Echinochloa colona</i>
	Kodo	Goose grass	<i>Eleusine indica</i>
	Bhangra, Bhangaraiya	False daisy	<i>Eclipta alba</i>
	Bara-nagar-motha	Flat sedge	<i>Cyperus iria</i>
	Kankaua	Day flower	<i>Commelina benghalensis</i>
Weed management	Critical stage of weeding	Recommended practice for organic condition	
	20-25 & 40-45 DAT	Hand weeding and summer ploughing	
Organic plant protection practices	Name of pest/ disease	Organic material recommended for control	Quantity (kg or litres/ ha)
	White ant, grubs	Kalichakra (metarhizium aniopliae)	Soil- 1-2kg/40 kg FYM/acreFoliar-1kg/ kg jaggery in 200 litter/acer





Soil born disease	Trichoderma viride	Vermicompost should be treated with Trichoderma to grow its mycelium and treated vermicompost in used
Sheath blight and sheath rot	Pseudomonas fluorescence	10 gm/litter of water
Stem borer	Trichocard	8 trichocard/ha (2 times)
Blight and false smut	Neem or Karanj cake	500 kg/ha at the time of transplanting
Blast	Bael+Black Tulsi	25 gm each in 1 litre of water
Most of the insects leaf folder, stem borer, Gandhi bug	Neem seed kernel extract or Neem oil	Foliar 3-5ml/litre

Yield

Parameters	1 st year	2 nd year	3 rd year	4 th year	5 th year	6 th year	7 th year	8 th year	Mean
Economic yield (kg/ha)	1970	1880	3191	3396	3945	3305	Abrupt weather	4050	2717

Glimpses



Rice 100% organic



Rice 100% organic





Wheat (*Rabi*)

Important features of suitable varieties

Parameters	K-9107
Duration (days)	130
Average yield under organic condition (kg/ha)	2000-2500
Source (s) of availability	AICRP on wheat
Suitable regions/districts in the state	All district/Jharkhand
Specific resistance / tolerance to disease	Leaf blight

Field preparation: For field preparation of wheat one deep ploughing followed by 2 -3 harrowing with disc or tines and 2-3 planking should be given to prepare a well pulverised seed bed. Planking should be done after each ploughing.

Cultural practices

Seed rate (kg/ha) (Not applicable for nursery crops)	125 kg/ha		
Pre-sowing/planting treatment of seed/seedlings	Material	Recommended rate (kg/ha or lit/ha)	Method of application
	PSB & Azotobacter	250gm/10 kg seeds each	Warm the water and add 100 gm of jiggery. Mix it well and allow to cool and then add azotobacter culture in it. Finally seed is well mixed with azotobacter culture solution. The treated seed is allowed to dry in shade. Similarly the seed is again treated with PSB and finally sowing is done
Spacing (Row X plant) in cm	Row 20cm		
Basal application of organic manures including soil	Source	Quantity (q/ha)	
	FYM	66.66	





application of bio-fertilizers, bio-control agents etc	Karanj cake	8.33	
Top dressing of organic manures	Source	Quantity (q/ha)	Days after sowing/ planting or stage of crop
	Vermicompost	33.33	25-30 DAS
	Panchagavya	10-12 lit/ha mixed in 500-600 lit of water	
Irrigation practices	Number of irrigations	Most critical stages for irrigation	Depth of irrigation (cm)
	6	Crown root initiation, tillering, jointing, booting, flowering, milk and dough stages	5-6cm
Major weeds	Local name	English name	Scientific name
	Krishananeel	Red pimpernel	<i>Anagallis arvensis</i>
	Kateli	Bull thistle	<i>Cirsium arvense</i>
	Bathu	Common lambsquarters	<i>Chenopodium album</i>
	Motha	Nut sedge	<i>Cyperus difformis</i>
	Gehusa (gehu ka mama)	Canary grass	<i>Phalaris minor</i>
	Dub ghas	Couch grass	<i>Cynodon dactylon</i>
Weed management	Critical stage of weeding	Recommended practice for organic condition	
	20-25 & 40-45	Hand weeding and stale seed bed technique	
Organic plant protection practices	Name of pest/ disease	Organic material recommended for control	Quantity (kg or litres/ ha)
	White ant, grubs	Kalichakra (metarhizium anioptiae)	Soil- 1-2kg/40 kg FYM/acreFoliar-1kg/ kg jaggery in 200 litter/ acer

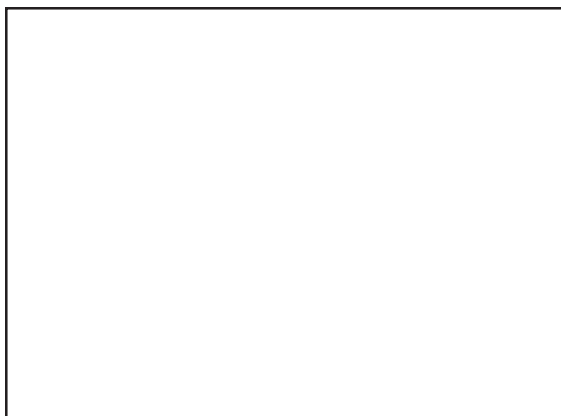


Most of the insects	Neem oil (Multinimore Vanguard)	Foliar 2.5ml/litre
Soil born disease	Trichoderma viride	Vermicompost should be treated with Trichoderma to grow its mycelium and treated vermicompost in used
Black rust, brown rust, yellow rust and leaf blight	Trichoderma herginum+ Pseudomonas fluorescence	5g/litre of water
Loose smut	Trichoderma herginum or Trichoderma viride	Seed treatment 5gm/kg seed

Yield

Parameters	1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th	Mean
Economic yield (kg/ha)	2048	2366	2528	2587	2000	1875	2240	1950	4399

Glimpses



Wheat 100% organic

Details of Specific Practices/products used/recommended

Panchgavya preparation method

Panchgavya can be prepared by mixing 3 litre of cow urine, 5 kg of cow dung, 2 litre of cow milk, curd of 2 litres of cow milk, 1 kg cow ghee, 5 litre water, 500 gm honey, 1 kg jaggery in earthen pot. Then the earthen pot is covered and left for 3 weeks. The prepared Panchgavya should be used only after sieving the material, about 2 litre of Panchgavya should be well mixed in 100 litre of water and sprayed to the crop plants. The prepared Panchgavya would be sufficient 1.5ha of land.

Lentil (*Rabi*)

Particulars	<i>Rabi</i>
Crop	Lentil
Fortnight of sowing/planting	2 nd fortnight of Nov.
Fortnight of harvesting	2 nd fortnight of March.
Varieties suitable for organic farming	PL-406

Important features of suitable varieties

Parameters	
Duration (days)	115
Average yield under organic condition (kg/ha)	600-800
Source (s) of availability	Directorate of Seed & Farm, BAU.
Suitable regions/districts in the state	All district /Jharkhand
Specific resistance / tolerance to disease	moderately resistant wilt and rust

Field preparation: For field preparation of lentil one deep ploughing followed by 2-3 cross harrowing should be given. After harrowing, the field should be levelled by giving a gentle slope to ease in irrigation.

Cultural practices

Seed rate (kg/ha) (Not applicable for nursery crops)	25-30 kg/ha		
Pre-sowing/planting treatment of seed/seedlings	Material	Recommended rate (kg/ha or lit/ha)	Method of application





	PSB & Rhizobium culture	250 g/10 kg seeds	Warm the water and add 100 gm of jiggery. Mix it well and allow to cool and then add rhizobium culture in it. Finally seed is well mixed with rhizobium culture solution. The treated seed is allowed to dry in shade. Similarly the seed is again treated with PSB and finally sowing is done
Spacing (Row × plant) in cm	25 x 8cm		
Basal application of organic manures including soil application of bio-fertilizers, bio-control agents etc	Source	Quantity(q/ha)	
	FYM	14.0	
Top dressing of organic manures	Source	Quantity(q/ha)	
	Karanj cake	2.0	
Irrigation practices	Vermicompost	7.0	Days after sowing/ planting or stage of crop
	Number of irrigations	Most critical stages for irrigation	25-30 DAS
Major weeds	2	Pre-flowering stage	Depth of irrigation (cm)
	Local name	English name	5-6
	Krishananeel	Red pimpernel	Scientific name
	Kateli	Bull thistle	<i>Anagallis arvensis</i>
	Bathu	Common lambsquarters	<i>Cirsium arvense</i>
	Motha	Nut grass	<i>Chenopodium album</i>
Weed management	Dub ghas	Bermuda grass	<i>Cyperus difformis</i>
	Kheshari	Sweet pea	<i>Cynodon dactylon</i>
	Critical stage of weeding	Recommended practice for organic condition	
	20-25 & 40-45	Hand weeding and stale seed bed technique	





Organic plant protection practices	Name of pest/disease	Organic material recommended for control	Quantity (kg or litres/ ha)
	White ant, grubs	Kalichakra (metarhizium anioptiae)	Soil- 1-2kg/40 kg FYM/acre Foliar-1kg/kg jaggery in 200 litter/acer
	Most of the insects	Neem oil (Multinimore Vanguard)	Foliar 2.5ml/litre
	Soil borne disease	Trichoderma	FYM or Vermicompost treated with trichoderma and applied to the field

Yield

Parameters	1 st year	2 nd year	3 rd year	4 th year	5 th year	6 th year	7 th year	8 th year	Mean
Economic yield (kg/ha)	650	735	920	750	562	0	770	649	630

Glimpses



Lentil 100% organic





Linseed (*Rabi*)

Particulars	<i>Rabi</i>
Crop	Linseed
Fortnight of sowing/planting	2 nd fortnight of Nov.
Fortnight of harvesting	1 st fortnight of April.
Varieties suitable for organic farming	Shekhar

Important features of suitable varieties

Parameters	Shekhar
Duration (days)	140
Average yield under organic condition (kg/ha)	500-700
Source (s) of availability	Directorate of seed & farm, BAU.
Suitable regions/districts in the state	All district/Jharkhand
Specific resistance / tolerance to pest	Moderately resistant to bud fly
Specific resistance / tolerance to disease	Resistant to powdery mildew, rust, wilt and moderately resistant to alternaria blight

Field preparation: Field should be prepared by giving 1 ploughing by soil turning plough followed by 2-3 harrowing and finally planking.

Cultural practices

Seed rate (kg/ha)	25-30 kg/ha		
Pre-sowing/planting treatment of seed/seedlings	Material	Recommended rate (kg/ha or lit/ha)	Method of application
	PSB & Azotobacter	250 g/10 kg seeds each	Warm the water and add 100 gm of jiggery. Mix it well and allow to cool and then add azotobacter culture in it. Finally seed is well mixed with azotobacter culture





				<p>solution. The treated seed is allowed to dry in shade. Similarly the seed is again treated with PSB and finally sowing is done</p>
Spacing (Row × plant) in cm	Row 30cm			
Number of seedlings/hill (in nursery crops only)	-			
Basal application of organic manures including soil application of bio-fertilizers, bio-control agents etc	Source	Quantity (q/ha)		
	FYM	26.66		
Top dressing of organic manures	Source	Quantity (q/ha)	Days after sowing/ planting or stage of crop	
	Vermicompost	13.33	25-30 DAS	
Irrigation practices	Number of irrigations	Most critical stages for irrigation	Depth of irrigation (cm)	
	3	Three irrigation at 35, 55 and 75 days after sowing proved very effective	5-6 cm	
Major weeds	Local name	English name	Scientific name	
	Krishananeel	Red pimpernel	<i>Anagallis arvensis</i>	
	Kateli	Bull thistle	<i>Cirsium arvense</i>	
	Bathu	Common lambsquarters	<i>Chenopodium album</i>	
	Motha	Nut grass	<i>Cyperus difformis</i>	
Weed management	Dub ghas	Bermuda grass	<i>Cynodon dactylon</i>	
	Critical stage of weeding	Recommended practice for organic condition		
	20-25 & 40-45	Hand weeding and stale seed bed technique		





Organic plant protection practices	Name of pest/disease	Organic material recommended for control	Quantity (kg or litres/ ha)
	White ant, grubs	Kalichakra (metarhizium anioptiae)	Soil- 1-2kg/40 kg FYM/acre Foliar-1kg/kg jaggery in 200 litter/acer
	Most of the insects	Neem oil (Multinimore Vanguard)	Foliar 2.5ml/litre
	Soil born disease	Trichoderma	Trichoderma powder mixed with vermicompost of FYM to develop its mycelium and applied to whole field

Yield

Parameters	1 st *	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th	Mean
Economic yield (kg/ha)	492	350	420	400	550	700	790	795	562

Glimpses



Linseed 100% organic





Potato (*Rabi*)

Particulars	<i>Rabi</i>
Crop	Potato
Fortnight of sowing/planting	2 nd fortnight of Nov.
Fortnight of harvesting	2 nd fortnight of Feb.
Varieties suitable for organic farming	Kufri Ashoka

Important features of suitable varieties

Parameters	Kufri Ashoka (Potato)
Duration (days)	95
Average yield under organic condition (kg/ha)	18000-20000
Source (s) of availability	Ram Krishna Mission, Ranchi
Suitable regions/districts in the state	All district/Jharkhand

Field preparation: Land should be well prepared by deep ploughing with mould-bold plough followed by 3-4 cross harrow wings. Each harrowing should be followed by planking so that the soil is well pulverised and levelled.

Cultural practices

Seed rate (kg/ha)	300 kg/ha		
Pre-sowing/planting treatment of seed/seedlings	Material	Recommended rate (kg/ha or lit/ha)	Method of application
	PSB & Azotobacter	250 g/10 kg seeds	Warm the water and add 100 gm of jiggery. Mix it well and allow to cool and then add azotobacter culture in it. Finally seed is well mixed with azotobacter culture solution. The treated seed is allowed to dry in shade. Similarly the seed is again treated with PSB and finally sowing is done





Spacing (Row × plant) in cm	Row to row 50cm, tuber to tuber 20cm		
Basal application of organic manures including soil application of bio-fertilizers, bio-control agents etc	Source	Quantity (q/ha)	
	FYM	80.0	
	Karanj cake	10.0	
Top dressing of organic manures	Source	Quantity (q/ha)	Days after sowing/ planting or stage of crop
	Vermicompost	40.0	25-30 DAS
Irrigation practices	Number of irrigations	Most critical stages for irrigation	Depth of irrigation (cm)
	4-5	1 st irrigation at 4-5 days after seeding than after 10 days interval	5-6 cm
Major weeds	Local name	English name	Scientific name
	Krishananeel	Red pimpernel	<i>Anagallis arvensis</i>
	Kateli	Bull thistle	<i>Cirsium arvense</i>
	Bathu	Common lambsquarters	<i>Chenopodium album</i>
	Motha	Nut grass	<i>Cyperus difformis</i>
	Dub ghas	Bermuda grass	<i>Cynodon dactylon</i>
Weed management	Critical stage of weeding	Recommended practice for organic condition	
	20-25 & 40-45	Hand weeding and stale seed bed technique	
Organic plant protection practices	Name of pest/ disease	Organic material recommended for control	Quantity (kg or litres/ ha)
	White ant, grubs	Kalichakra (metarhizium anioptiae)	Soil- 1-2kg/40 kg FYM/acreFoliar-1kg/ kg jaggery in 200 litter/acer
	Most of the insects	Neem oil (Multimore Vanguard)	Foliar 2.5ml/litre
	Black Scurf	Trichoderma treated Neem cake	Soil application @ 5 q/ha



Yield

Parameters	1 st *	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th	Mean
Economic yield (kg/ha)	9110	17283	19500	20500	19166	18750	19000	19300	17826

Glimpses



Potato 100% organic

