Package of Practices for Cotton Cultivation in Odisha

Cotton Resaech Station, OUAT, Bhawanipatna

Major cropping system in the region

Intercropping:

- Cotton + Green gram / Black gram (1:2 row proportions)
- Cotton + pigeon Pea (8:2 row proportions)

Crop season: June to February

Hybrids & Varieties of Cotton recommended for cultivation in Odisha:

Sl.No	Hybrid Name	50% Boll bursting	Yield (q/ha)	2.5%Fibre length(mm)	Fibre Strength (g/tex)	Fibre fineness (mic)
1	JK-Durga	162	23.42	32.1	23.4	4.5
2	Atal	157	24.55	33.6	23.2	4.2
3	Dhano	158	24.49	32.4	23.8	4.5
4	Gabar	161	24.34	32.6	23.1	4.6
5	Sri Tulasi	155	23.58	33.3	24.1	4.6
6	Bajrang	165	19.55	32.2	23.3	4.5
7	Bunny	155	21.04	32.4	23.9	4.5
8	Bhagya	158	22.79	31.5	23.5	4.6
9	Akka	159	22.0	33.8	23.6	4.6
10	Baban	161	21.26	32.7	23.4	4.6
11	Savita	161	18.67	32.4	23.9	4.5
12	Chandramukhi	162	22.17	30.6	22.3	4.8
	Varieties Name					
	Suraj					
1	MCU-5	160	20.7	35.2	25.6	4.1
2	Surabhi	162	22.0	24.2	5.3	21.5

Land preparation:

- Moderately heavy to heavy well drained soil is suitable for cotton.
- Plough the soils having hard pan formation at shallow depths with MB plough at 0.5 M interval, first in one direction and then in the direction perpendicular to the previous one, once in three years.
- Spread 5.0 t of FYM or compost or 2.5 t of vermicompost per ha if available, uniformly on the unploughed soil.

Seed treatment:

- Seeds should be treated with imidachloprid 70 WG @ 7 g/kg of seed for protection against sucking pests

Seed rate and sowing:

- Early sowing is conducive to get higher yield. Complete sowing latest by end of June. Use a seed rate of 2.0-2.5 kg/ha both for variety and hybrids
- Dibble two seeds per pit at a depth of 4-5 cm and cover the seeds with soils.

Spacing and plant population:

- Dibble the crop in lines. Closer spacing of 90 cm X 60 cm can be adopted for increasing plant population to 18,500 per ha.

Thinning:

- Thin weaker plants in the cotton field at 10-12 days after germination. Gap filling is done with planting of seedlings raised in leaf bags.

Application of biofertilizer

- Seed treatment with azotobactor @ 25 gm/kg seed and PSB @ 20 gm/kg seed. In addition, apply Azospirillum (2 Kg/ha) and PSB (2 Kg/ha) mixed with 25 kg FYM and 25 kg of soil on the seed line. This saves 25% nitrogen besides increasing yield.

Application of inorganic fertilizers

- Fertiliser application should be made on the basis of soil test recommendation.
- Fertiliser dose of 120:60:60 kg NPK/ha for hybrids and 90:45:45 Kg NPK/ha for varieties gives higher yield. At sowing 25% N, 100% P and 50 % K should be applied. At 25-30 DAS (Square formation stage) apply 50% N and remaining 50% K . Rest 25% N should be applied at 55-60 DAS depending upon the availability of rainfall.
- Spraying of 1.5% DAP at 75 and 90 DAS and 0.75% DAP+ 0.75% MOP at 105 DAS help in better boll retention.
- Delay in application of basal dose of fertilizers reduces the yield of seed cotton to the tune of 10 to 40% within late duration period of 10 to 30 DAS

Management of Leaf reddening

- Spraying of 2% urea at flowering stage and 1% urea with 1% Magnesium sulphate at boll development stage reduces reddening of leaves and increases seed cotton yield.

Green manuring with sun hemp:

- Growing Sun hemp @ 20-25 kg/ha as a green manure and weed smothering crop in cotton and subsequent incorporation in soil at 21-25 DAS reduce weed growth, minimizes weeding cost and improves soil health considerably by adding 8-10 ton of green manure/ha supplying 30-40 kg Nitrogen to the soil.

Weed management:

- Keep the field weed free up to 60 days after sowing (9 weeks)
- Insufficient soil moisture is not available for applying herbicides hand weeding may be given at 10 – 20 days after crop emergence.
- Hand weeding at 20 DAS + Post-emergence directed spray of Glyphosate @ 1.0 kg/ha
- It is advisable to use separate sprayer for herbicide spray or the same sprayers should be washed thoroughly with water before using for spraying pesticides.

Plant Protection Technology:

General behavior insect pest of cotton

In Odisha state cotton crop is heavily damaged by almost 21 insect pests. Out of these at seedling stage sucking pests viz. jassids (*Amrasca biguttulla biguttulla*), Aphids (*Aphis gossypii*), Thrips (*Thrips tabaci*) cause serious damage to cotton crop. White fly (*Bemica tabaci*) has also become an important sucking pest. After square formation, bollworms viz. Spotted bollworm (*Earias insulana* and *Earias fabea*), American bollworm (*Helicoverpa armigera*) and pink bollworm (*Pectinophora gossypiella*) found to cause heavy losses in cotton crop. Occasionally red cotton bug (*Dysderecus cingulatus*) and dusky cotton bug (*Oxycarenus hyalinipennis*) found infesting cotton bolls. Incidence of leaf defoliator's viz. Tobacco leaf eating caterpillar (*Spodoptera litura*), Cotton leaf roller (*Sylepta derogata*) etc are occurring frequently. Since last few years incidence of leaf miner (*Bacculatrx thuribiella*) and mealy bug (*Phenacoccus solenopsis*& *Ferrisia virgata*) are also noticed.

Pest management

- Removal of cotton stubbles after last picking to break the cycles of problem pests in the system as a whole
- Avoid stacking of stalks in the field
- Avoid ratoon and double cotton crop
- Adopt proper crop rotation
- Grow one variety throughout the village as far as possible.
- Synchronize the sowing time in the villages and complete the sowing within 10 to 15 days.
- Avoid other Malvaceous crops in the vicinity of cotton crop
- Timely earthing up and other agronomic practices should be done.

- Hand pick and burn egg masses, visible larvae, affected and dropped squares, flowers and fruits periodically and squash pink bollworm in the rosettes.
- Use pheromone traps for monitoring of American bollworm, spotted bollworms, pink bollworm and Spodoptera
- Use locally fabricated light traps (modified Robinson type) with 125 Watt mercury lamps to determine the prevalence and insect population fluctuations.
- Apply insecticides only where it is absolutely necessary when pest population or damage reaches ET level.

Economic threshold level for important pests

Pests	ETL
Thrips	50 nymphs or adults / 50 leaves
Aphids	15% of infested plant
Leafhopper	50 nymphs or adults / 50 leaves
Mite	10 mites / cm2 leaf area
Spotted Boll-worms	10% infested shoots / squares / bolls
Spiny Boll-worms	10% infested shoots / squares / bolls
Pink Boll-worms	10% infested fruiting parts
Helicoverpa	One egg or one larva / plant
Whiteflies	5 – 10 leaf
Stem weevil	10% infestation
Tobacco cutworm	8 egg masses / 100 m row

Chemical Insecticides and their doses recommended:

Sucking pests: (Aphids, jassids, White fly and thrips)

- Imidacloprid 70 ws seed treatment @ 7 gm/kg seed or Thiomethoxam 70 ws seed treatment @ 5 gm/kg seed
- Spraying of Flonicamid 50 WG @ 0.4g/lt or Diafenthiuron 50 WP @1.2g/lt or Buprofezin 25 SC @ 2ml/lt or Thiomethoxam 25 WG @ 0.2g /lt or Fipronil 5% SC @ 3.5ml/lt is effective in controlling sucking pests like aphids, jassids, whitefly and thrips

For Bollworms

- Need based spraying of Flubendiamide (Fame) 48 SC @ 0.25ml/lt or Profenophos @ 2 ml/lt or Indoxacarb 1 ml /lt or Spinosad (Tracer) @ 0.5ml/lt is effective in controlling bollworms.

Biological Agents Recommended:

- Release of Trichogramma chilonis egg parasitoid @ 1.5 lakh/ha
- Release of chrysoperla carnea eggs @ 10000/ha
- Spray of HaNPV @ 250-500 LE/ha for H. armigera

Botanicals Recommended:

- Neem seed extract 5 %
- Spray of azadiracttin 300 ppm @ 5 ml/L of water
- Spray of azadiractin 10000 ppm @ 1 ml/lit or azadiractin 1500 ppm @ 2.5 ml/L

Disease management:

- Bacterial Leaf Blight/Triangular leaf spot: Spray 1g Streptocycline and 25 g Copper Oxychloride in 10 litre of water. Repeat spraying at 10 days interval twice or thrice if drizzling continues.
- Grey Mildew: Spray Carbendazim @ 2g/litre of water

Harvesting:

- Fifty percent bursting of bolls start from 105 to 111 days and 4 to 5 pickings are taken within 50 days. Picking should be done only when the bolls are fully burst open and in the cool hours of the morning. The mixture of dry leaves should be avoided to maintain quality.

Yield:

- Under rainfed condition with good management varieties give seed cotton yield of 20-22 q/ha and the hybrids give 20-25 q/ha.

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