

COTTON ADVISORY

CONTINGENCY MEASURES TO COMBAT DEFICIT RAINFALL

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Agronomy Measures

Farm operation	Intervention	Advisory
Land preparation	Land configuration	<ul style="list-style-type: none"> Wherever possible prepare raised beds or ridges and furrows and undertake planting on beds or ridges.
Manure application	Organic manures: two weeks before sowing	<ul style="list-style-type: none"> Organic manure application and incorporation benefits are more in a dry season by improving water and nutrient holding capacity besides its growth stimulation and slow release of nutrients. Apply farm yard manure @ 5-10 t/ha or press mud @ 5 t/ha at least once in three years
Sowing	Sowing after receipt of soaking rain (~70 mm)	<ul style="list-style-type: none"> Take up timely sowing once 70 mm cumulative rainfall is received in three consecutive days and day temperature comes down to 35°C. Dry sowing may be risky. Sowing may be done on raised beds or ridges Use short duration (150-160 days) varieties and hybrids. Gap filling may be taken at around 8 days after sowing to maintain adequate crop stand
Weed management	Pre-emergence weedicid application	<ul style="list-style-type: none"> Apply Pendimethalin 38.7 CS @ 4 ml/ lit* of water within 24 - 48 h after sowing (*500 litre spray volume per hectare) Hoeing at two weeks interval for weed removal. At the time of last hoeing, tie rope to blades of hoe for earthing up of rows to conserve soil moisture in furrow.
Conservation of rainwater	Opening of dead furrow	<ul style="list-style-type: none"> When sowing was done on flat bed, open dead furrow with desi plough after 2-3 row interval after each intercultural operation. If sowing was done on ridges, block the furrows at 5-8 meters interval to reduce runoff and increase in-situ moisture conservation.
Fertilizer	Basal and top dressing of fertilizers	<ul style="list-style-type: none"> Apply complex fertilizers (10-26-26) @ 2 bags/ha as basal or within 10-15 days of sowing followed by top dressing of the 2 bag 10-26-26 and 1 bag Urea/ha at squaring stage. Top dressing of 1 bag urea/ha at 70 DAS after receipt of rains. Soil application of 15 kg/ha ZnSO₄ at first top dressing is highly recommended. In case of anticipated early withdrawal of the monsoon, the last top dressing can be propped by a week.
Balanced nutrition	Foliar application of nutrients (Nitrogen, Zn, Bo, Mg)	<ul style="list-style-type: none"> Foliar correction of nutrient deficiencies at flowering and boll development stages with spray of 2% urea or 1% 19:19:19 or 1% Potassium Nitrate (KNO₃). Apply Zn through spray of 0.5% ZnSO₄ and Boron through spray of 0.2% Boric acid. Apply MgSO₄ @ 0.5% at boll development stages Use lime @ 0.5% with foliar spray of ZnSO₄ and MgSO₄
Crop management	Hormone application	<ul style="list-style-type: none"> In case of continuous cloudy days in August,

		to prevent bud and boll shedding spray Napthalic acetic acid (NAA) @ 20 ppm (Planofix 4.5 SL @ 2 ml/litre of water) at the time of peak flowering stage.
Irrigation	Protective irrigation in case of extended dry spell	<ul style="list-style-type: none"> In case of dry spell of >15 days with appearance of cracks of pencil thickness, provide a life-saving irrigation through sprinklers, perforated pipes, drip or alternate furrow wherever possible

Likely insect pest and disease situation due to deficit rainfall conditions

According to IMD prediction, El Nino conditions are likely to occur during the monsoon season 2023. Under rainfall deficit situation, pest and disease incidence in cotton crop is likely to be altered. Timely interventions can help mitigate crop loss in the changed scenario of pests and disease occurrence.

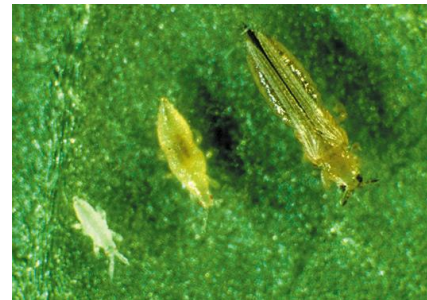
Crop Protection Measures

INSECT PESTS

1. Thrips (Likely to increase)

ETL: 25% plants showing silvery patches on underside of leaves above mid canopy or 10 thrips per leaf

Low to medium rainfall during the initial period of crop season followed by intermittent long dry spells between two rainfall events may create transitory/ temporary hot and dry conditions favouring rapid population build-up of thrips. Heavy thrips damage at the early vegetative growth stage (seedling, 45 DAS) severely hampers crop growth, delaying the formation of buds and squares. The stunted crop growth and premature shedding of squares lead to significant yield reduction.



Management (Crop Stage based)

0-60 Days After Sowing (DAS)	No need to spray. If needed, spray Neem oil or neem based formulation (3000 or 1500 ppm) 50 ml + 5% NSKE + 10 gm detergent powder per 10 litres of water.
60-90 DAS	Spray Thiamethoxam 25% WG @ 2 gm/10L (100g/ha) Or Spinetoram 11.7 SC @ 8.4ml/10L (420 ml/ha).

2. Jassid (Likely to increase with intermittent rain)

Water-stressed plants are likely to be less attacked by jassid as the pest feed on xylem or cortical cells.

Well-spread and intermittent rain results in good plant growth. These conditions may favour the increase of jassid population for a short period of time.



Management (Crop Stage based)

0-60 DAS	No need to spray
60-90 DAS	Spray Flonicamid 50WG @ 4g/10L (200g/ha) Or Dinotefuran 20SG @ 3g/10L (150g/ha) Or Imidacloprid 17.8 SL @ 3ml/10L (150ml/ha).
90-120 DAS	Spray Thiamethoxam 25WG @ 2g/10L (100g/ha)

3. Aphid (Likely to increase)

ETL: 10% plants showing symptoms cupping / crumpling of few leaves on the upper portion of plant
Water stressed plants are likely to succumb to aphid attack. In the absence of natural mortality factor (washing effect by rainfall) aphid populations are likely to increase.

Management (Crop Stage based)

0-60 DAS	No need to spray
60-90 DAS	Spray Flonicamid 50WG @ 4g/10L (200g/ha) or Dinotefuran 20SG @ 3g/10L (150g/ha).
90-120 DAS	Spray Thiamethoxam 25WG @ 2g/10L (100g/ha)

4. Whitefly (Likely to be less)

ETL: 6 whitefly/ leaf

Whitefly proliferate in hot and humid conditions, however, dry conditions may hinder the multiplication of whitefly.



Management (Crop Stage based)

0-60 DAS	No need to spray
60-90 DAS	Install yellow sticky traps @ 20/ha during July to August for monitoring and @ 100/ha for management. Spray Diafenthiuron 50% WP @ 12g/10L (600 g/ha) Or Afidopyropen 50g/L @ 20ml/10L (1000 ml/ha) Or Dinotefuran 20 SG @ 3g/10L (150g/ha) Or Flonicamid 50 WG @ 4g/10L (200 g/ha) or Clothianidin 50% WDG 1ml/10L (50ml/ha).

5. Pink bollworm (Likely to increase)

ETL: More than 8 moths / trap per night for 3 consecutive nights and or more than 10 % infested flowers or bolls with live larvae

The frequent light showers of rains signal the hibernating/diapausing populations of pink bollworms from the previous year's inoculum to break the dormancy and resume their active growth. It is observed that the PBW moth emergence starts approximately 15-20 days after the receipt of rainfall. Low to medium rainfall favours the continuous flushes of moths which colonizes the new season's crop. The frequent light showers in the first quarter of the season (June-July) may trigger the moth emergence resulting in the initial successful establishment of PBW on cotton crop. Low but well distributed rainfall over a cropping season, may lead to the timely onset of the reproductive phase of cotton crop coinciding with the pink bollworm moth emergence, thus increasing the chances for successful colonization and establishment of the pest.



Management (Crop Stage based)

0-60 DAS	At 45 DAS, install pheromone traps @ 5 per hectare. Spray NSKE 5% + Neem oil 5 ml /litre or neem oil-based formulation 5 ml /litre (300 or 1500 ppm) + 1.0gm laundry detergent emulsion (Initial 1-2 sprays). (NSKE 25L + Neem oil 2.5L + 0.5kg laundry detergent emulsion per hectare). Use 150-200 litres of water /acre or 375-500 litre/ ha for dilution of the insecticides.
60-90 DAS	Observe for rosette flowers, pluck and destroy them. At boll formation stage, farmers are advised to inspect the presence and damage of pink bollworm by plucking 20 green bolls from different plants randomly (one boll per plant). If ETL crossed i.e. >10% damaged flowers (Rosette flowers) or 10% damaged green bolls (at least two out of 20 bolls having white or pink larvae or exit holes) and or 8 moths catch per pheromone trap for consecutive 3 days, spray Profenofos 50 EC @ 30 ml/10L (1500

	ml/ha) Or Emamectin benzoate 5SG @ 5g/10L (250 g/ha) Or Indoxacarb 14.5 SC @10ml/10L (500ml/ha) Or Chlorpyrifos 20 % EC @ 25ml/10L (1250 ml/ha).
90-120 DAS	Release parasitoid <i>Trichogramma bactrae</i> @ 60000 per acre or spray cotton crop with Profenofos 50EC @ 30 ml/10L (1500 ml/ha) Or Emamectin benzoate 5SG @ 5g/10L (250 g/ha) Or Indoxacarb 14.5 SC @10ml/10L (500ml/ha) Or Chlorpyrifos 20 % EC @ 25ml/10L (1250 ml/ha).
>120 DAS	Spray Cypermethrin 10% EC @ 10-15ml/10L (550-760 ml/ha) Or cypermethrin 25% EC @ 4-6ml (160-280 ml/ha) Or Lambda cyhalothrin 5%EC @ 10ml/10L (500 ml/ha) Or deltamethrin 2.8 EC @ 10ml (500 ml/ha) Or Fenpropathrin 10% EC @ 15-20ml/10L (750-1000 ml/ha) or Fenvalerate 20 EC @ 10ml/10L (500 ml/ha) Or alphacypermethrin 10% EC @ 6ml/10L (300 ml/ha).

6. American bollworm (*H. Armigera*) (Likely to increase)

ETL:20% plants having one or more ‘flared up’ squares or 5-10% infested squares or bolls

Incidence of *H. armigera* may increase in non-Bt due to higher temperatures, host-plant abundance and absence of natural mortality factor.



Management (Crop Stage based)

0-60 DAS	No need to spray
60-90 DAS	For Non Bt, spray Chlorantraniliprole 18.5SC @ 3ml/10L (150ml/ha) Or Flubendiamide 39.35%SC @ 2.5 ml/10L (125ml/ha) Or Indoxacarb 14.5 SC @ 10 ml/10L (500ml/ha).
90-120 DAS	For Non Bt/ in Desi (arboreum) cotton, spray Flubendiamide 39.35 SC @ 3ml/10L (150ml/ha) Or Indoxacarb 14.5 SC @10ml/10L (500 ml/ha) Or Spinosad 45SC 4 ml/10L (200ml/ha)

DISEASES

1. Dry root rot disease (*Rhizoctonia bataticola*= *Macrophominaphaseolina*) (Likely to occur during seedling stage)

Low to medium rainfall during the initial period of crop season followed by intermittent long dry spells between two rainfall events may create transitory/ temporary hot and dry conditions favouring the occurrence of dry root rot disease.

Management

Seed treatment with Carboxin 37.5% + Thiram 37.5% DS @3.5 g per kg of seeds for root rot and bacterial leaf blight (BLB) disease **Or** *Pseudomonas fluorescens* WP @10g/kg seeds for BLB disease **Or** Fluxapyroxad (333 g/L FS) @1.5 ml/kg seed for seedling disease **Or** Tetraconazole 11.6% W/W (12.5% w/v) SL @1.5 ml/ kg of seeds for seed-borne fungal disease management.

Drenching early symptomatic plants and surrounding plants with *Trichoderma* spp. (*T.harzianum* or *T.viride*) 1% WP @50g **Or** Carbendazim 50WP @ 20g/ 10 liters of water



2. Wilt (Likely to be less)

Low moisture in the soil reduces the chances of occurrence of wilt diseases.

3. Leaf spots (Likely to be less)

Atmospheric low relative humidity reduces chances of foliar diseases.

Management

Prophylactic spray of Propineb 70 WP@25-30 g **Or** Azoxystrobin 18.2%w/w + Difenoconazole 11.4% w/w SC@ 10 ml **Or** Fluxapyroxad 167 g/l + Pyraclostrobin333 g/l SC@ 6g **Or** Carbendazim 50 WP@2gm **Or** Propiconazole 25 EC @10 ml **Or** Pyraclostrobin 5% + Metiram 55% WG @20 g per 10 litres water.

4. Parawilt (likely to occur wherever wet spell is followed by bright sunshine and hot days)

Management

As soon as sudden wilting is observed, drench the affected plants with Copper oxychloride 50 WP/WG@ 25 g or carbendazim 50 WP@10 g+ Urea @150 g in 10 litres of water within 24-48 hours.



5. Boll rot (Internal and External) (Likely to occur in heavy soils only)

Low moisture in the air reduces the chances of the occurrence of boll rot.

Management

In heavy soils, prophylactic spray of copper oxychloride 50 WP/WG @25-30 g followed by foliar spray of propiconazole 25 EC @10 ml or Propineb 70 WP @25 g or carbendazim 50 WP @4 g or Fluxapyroxad 167 g/L + Pyraclostrobin 333 g/L SC @ 6 g mixed in 10 litres of water after seven days is suggested during flowering and early boll developmental stages (60-90 DAS) at 15 days interval to manage boll rot disease complex in cotton, particularly in case of prevailing cloudy weather, high humidity, winds, rain splash and drizzle rains occurs.



External Boll rot



Internal Boll rot

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