



# Stress Management Agro-Advisory for the State of Maharashtra

October 25-November 07, 2024

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# Managing Abiotic and Biotic Stresses in Agriculture

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(Oct 25-Nov 07, 2024)

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### 1. Weather Forecast (India Meteorological Department, New Delhi)

#### 1.1. Rainfall

- There may be no rainfall in most parts of the state.

#### 1.2. Temperature

- The maximum temperature may vary between 28-32°C in most parts of the state remaining near normal in most parts of the state.
- The minimum temperature may vary between 16-20°C, remaining 1-2°C below normal in most parts of the state.

### 2. Managing Abiotic Stresses

#### 2.1. Atmospheric Stresses

##### 2.1.1. Crops

- **Grape:** Complete forward pruning during this period. However, pruning need to be staggered by following local weather forecast.
- **Dragon fruit:** Remove over-grown and damaged shoots after harvesting fruits.
- **Spraying Operation:** Do not spray in windy conditions and also on wet foliage immediately after rains. Use sticker adjuvant along with spray solutions.
- **New Plantations:** In case of newly planted orchards, support the plants by tying them straight using bamboo sticks to avoid damage due to hot sun, thunderstorms, and heavy winds. All the spraying activities should be done in the morning or evening hours.

##### 2.1.2. Livestock

- Repair roofs of the animal sheds, wherever necessary, to ensure protection for animals from rains.
- Keep the animals indoor during thunderstorm/ lightening events.
- To protect livestock from extreme weather events and storms, keep the animals indoor during night hours.
- Avoid overcrowding of animals in livestock shed
- Control of ecto-parasites and endo-parasites should be carried out
- The floor of the animal shed should be kept clean and dry
- Maintain the surrounding of animal shed clean and hygienic and remove the unwanted vegetation nearby the sheds.

## 2.2. Water Stresses

### 2.2.1. Crops

- **Grape:** Pre-pruning water stress for 10-15 days is mandatory to encourage natural defoliation. Therefore, it is advised to withhold irrigation during pre-pruning period.
- **Sweet orange:** Provide regular irrigation @ 100-120 L per day per plant to the fruit bearing trees.
- **Vegetable crops:** Transplanting on raised beds to be preferred for vegetable crop to avoid damage due to waterlogging and better root aeration.
- Use of mulching and drip irrigation system for new transplantation in vegetable crops for efficient use of water and to avoid weed growth.
- If there are dry spells, light irrigation is to be applied in vegetable crops.
- **Brinjal:** Use of grafted eggplant seedlings for transplanting. Foliar application of salicylic acid (0.3-0.5g/L) at monthly interval after transplanting will help to overcome the effect of water stress.
- **Pigeon pea:** Given the possibility of rainfall, precautions should be taken to prevent waterlogging in standing crops of pigeon pea in order to avoid incidence of wilt.
- **Pomegranate:** Avoid irrigation water imbalance in *Mrig bahar* orchards, which is near to maturity, to avoid fruit cracking.

### 2.2.2. Livestock

- Provide clean and potable drinking water to animals round the clock
- Provide mineral mixture @ 30-40 g/day/cattle for improving milk production and reproductive efficiency

### 2.2.3. Fisheries

- Feed may be provided to fingerlings @ 5-7 % of body weight trice a day, morning, noon and evening for good growth of fingerlings fish
- Protein may be included @ 30-35% in the fish feed for proper growth and development of the fingerlings fish
- From time to time, the growth of the fingerlings may be checked for better maintenance of fish stock and protection from diseases
- The unutilized feed in the feeding tray may be checked frequently to standardized the feed rate
- Checked the primary productivity of the pond and water
- Diseased or injured fish should be dipped in 1 ppm  $\text{KMnO}_4$  (Potassium permanganate) solution for 1 minute
- Application of lime @ 25-27 kg/ha is advised preferably during 9-10 am After 10 days of lime application, apply cow dung @ 200 kg /ha, urea @ 25 kg/ha. If rain continues, avoid application of lime, manuring and fertilization.
- Monitor the water quality parameters viz. dissolved oxygen (6.0-7.0 ppm), pH (7.0-8.5), ammonia (0.05 ppm), nitrate (50-150 ppm), nitrite (0.1 ppm),  $\text{CO}_2$  (less than 10 ppm), and  $\text{H}_2\text{S}$  (0.002 ppm) in fish pond carefully.
- Limestone @ 50-100 kg/acre, potassium permanganate @ 1-2 kg/acre and salt @ 100 kg/acre may be applied in pond to avoid fungal, bacterial and parasitic diseases like fin rot, gill rot, EUS and argulosis.

## 2.3. Soil Stresses

- **Grape:** Supply 80 kg N per ha through drip irrigation during 1 to 20 days after forward pruning.
- **Sweet orange:** For *Ambia bahar* crop, muriate of potash @180 g per tree should be applied uniformly by leaving about 3 feet distance around the grown up trees. The applied fertilizer should be thoroughly mixed in the soil.
- **All orchards:** It's time for tillage in between rows and soil pulverization in the plant basins to break the compactness of top-soil to improve soil aeration and weed management.

## 3. Managing Biotic Stresses

### 3.1. Crops

- **Grape:** Spray Imidachloprid 200SL @ 0.8 ml L<sup>-1</sup> immediately after pruning to control damage of sprouting buds by flea beetle. Prophylactic spray of Cymoxanil 8% + Mancozeb 64% @ 1.5 g L<sup>-1</sup> at three-leaf stage to be done for control of downy mildew infection.
- **Sweet orange:** To manage fruit sucking moth, spray neem oil @ 10 ml/L of water and destroy all the fallen fruits by burying in a pit. Poison baiting with 10 ml Chlorpyriphos 20EC mixed with 100 g jaggery and 100 ml of sweet orange juice in 900 ml water (two per 25 trees).
- **Guava:** Use pheromone trap bottles for integrated management of fruit fly. Tie the trap bottles at 1.5 to 2 meter height in orchard @ 8 Nos/ ha.
- **Citrus crops:** During this period citrus leaf eating caterpillar is active. The pest can be effectively controlled by foliar spray of Cypermethrin 10EC @ 1 ml or Fenitrothion 50EC @ 2 ml per L.
- **Custard apple:** Spray Carbendazim 50WP @ 1.5 g per L or Copper oxy chloride @ 2.5 g per L to avoid blackening of fruits and spray Buprofezin 25 SC @ 1.25 ml per L to manage mealybugs.
- **Acid lime:** If citrus trees are showing oozing symptoms of gum, then scrap the area with a sharp knife and apply Mefenoxam MZ-68 or Fosetyl Al paste on it. Apply Bordeaux paste on the tree trunk up to height of 60 cm by paint brush.
- **Pomegranate:** To manage thrips, install yellow/ blue sticky traps @ 75 per hectare randomly at 15 cm below from the canopy top of the plant. To control fruit borer infestation, remove all the damaged fruits with holes and dispose them by burying in pit and take a spray with any one of the insecticide Cyantraniliprole 10.26% OD @ 0.75 ml/L or Chlorantraniliprole 18.5% SC @ 0.75 ml/L or Flonicamid 50% WG @ 0.75-1.0 ml/L water.
- **Brinjal:** Use of water trap/Leuci lure pheromone traps to manage fruit and shoot borer to monitor, attract and kill the male moths @ 12/ ha and change the vial once in three weeks and spray Chlorantraniliprole 18.5 SC @ 0.3 ml/L once in 15 days depending upon the pest population.
- **Solanaceous and Cucurbitaceous vegetables:** Fluctuation in daily mean temperature may increase the infestation of mites and to manage them, spray Spiromesifen 22.9 SC @ 0.5 ml/L or Abamectin @ 0.5 ml/L.
- **All vegetable crops:**
  - It is necessary to follow integrated pest and diseases management practices such as disease-free seedlings from certified nursery, drenching with copper oxychloride @ 2.5 g/L of water to avoid post-transplanting damping-off in addition to use of systemic insecticides like Imidacloprid @ 0.5 ml/L to manage sucking pests.

- Maintenance of optimum /recommended plant spacing to avoid the incidence of disease and pest in solanaceous vegetable crops
- Procurement of healthy and disease-free seedlings of vegetable crops from certified nursery is a pre-requisite.
- Integrated management of pest and diseases to be followed in vegetable crops starting from land preparation.
- Application of preventive spray of liquid *Trichoderma* sp. formulation for diseases management @ 5ml/litre.
- Application of *Trichoderma* sp. + *Pseudomonas* sp. @ 1litre/acre through drip irrigation system to manage soil borne pathogens.
- Use of water trap / lure traps to manage fruit and shoot borer in brinjal to monitor, attract and kill the male moths @ 12 nos./ha and change the vial once in 3 weeks.

### 3.2. Livestock

- There is a very high risk of Haemorrhagic Septicaemia (HS) in the Dhule district and Black quarter (BQ) and Enterotoxaemia (ET) in Ahmadnagar district. Affected animals may be isolated and treated with suitable antibiotics and vaccination is to be done in consultation with the local veterinarians.
- There is a very high risk of Foot and Mouth Disease (FMD) in Ahmadnagar, and Kolhapur districts.
- There is a very high risk of Peste des Petits Ruminants (PPR) in the Ahmadnagar, Jalgaon Nashik and Pune districts.
- There is a very high risk of African Swine Fever (ASF) in Amravati district.
- There is a very high risk of Sheep and Goat Pox in Ahmadnagar, district.
- Vaccination for FMD, PPR, BT, and ASF in the concerned districts may be done in consultation with the local veterinarians.
- Monitor animals for any sickness particularly related to digestive, dermal, or respiratory problems, and treat them by consulting a veterinarian.
- There is a very high risk of Theileriosis in the Akola district.
- For treatment of ectoparasitic infestation, dipping (if not done during the last three months) needs to be carried out with Ectomin/Butox, post-shearing on sunny days. Anti-parasitic drugs should be used under the guidance of a veterinarian.
- Spot the sick animals and isolate them in a separate shed for treatment.

## 4. Other Advisories

### 4.1. Crops

- **Grape:** Immediately after forward pruning, paste distal two buds of the canes with Hydrogen cyanamide 1.0 to 1.5% solution, depending on cane thickness, for selective and enhanced bud burst. Shoot thinning should be carried out immediately after the emergence of inflorescence. Retain 10-12 shoots per square meter.
- **Citrus:** To increase the size of Ambia crop (June-July) fruits, spray Mono-potassium phosphate 5g per L along with Gibberllic Acid (GA<sub>3</sub>) 15ppm.

- **Pomegranate:** After harvest of *hasta bahar* fruits, medium to deep pruning (removal of criss-cross, diseased, broken and overcrowded branches) should be done and basal dose of nutrients should be applied.
- **Drumstick:** After back pruning, thin out the extra shoots and tip growing shoots at 60-80 cm length. Spray Azadirachtin 1% @ 1ml L<sup>-1</sup> to manage leaf eating caterpillar.

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