POMEGRANATE:

Basic Information

1. **Name**:
    - Pomegranate (*Punica granatum*): Pomegranate is a drought-tolerant fruit that belongs to the Lythraceae family. It is known for its high nutritional value, rich flavor, and medicinal properties, making it an economically important crop.
2. **Best Season for Growing Pomegranates**:
    - **Best Growing Season**: Pomegranates thrive in semi-arid and tropical climates with specific growing conditions:
        - **Monsoon Planting**: Best suited for planting during June to August.
        - **Spring Planting**: Planting can also be done during February to March in regions with irrigation facilities.
    - **Temperature**:
        - Ideal temperature: Pomegranates grow best in the range of 25°C to 35°C.
        - It can tolerate high temperatures but is sensitive to frost, which can damage the fruit and flowers.
3. **Best Soil Type**:
    - **Soil Requirements**:
        - Pomegranates grow well in a variety of soils, ranging from sandy loam to black soil.
        - A slightly acidic to neutral soil pH of 6.0–7.5 is ideal.
    - **Soil Texture**:
        - Well-drained soil is essential to avoid waterlogging, which can cause root rot.
    - **Soil Preparation**:
        - Incorporate organic matter such as farmyard manure or compost to enhance soil fertility.
        - Deep plowing ensures better root penetration and aeration.
4. **Time Period**:
    - **Flowering and Fruiting**:
        - Pomegranate trees typically start bearing fruits 2–3 years after planting.
        - Fruits are harvested 5–7 months after flowering, depending on the variety and climatic conditions.
    - **Growth Period**:

        - Young saplings require 3–4 years to achieve full production potential.
5. **Estimated Cost per Acre**:
    - **Saplings**: ₹20,000–₹50,000 per acre (depending on the variety and plant spacing).
    - **Land Preparation**: ₹10,000–₹15,000 per acre (plowing, leveling, and pit preparation).
    - **Fertilizers and Manures**: ₹12,000–₹20,000 per acre (as per soil test recommendations).
    - **Irrigation**: ₹15,000–₹25,000 per acre (drip irrigation is recommended for efficient water usage).
    - **Pest and Disease Control**: ₹10,000–₹15,000 per acre.
    - **Labor Costs**: ₹20,000–₹40,000 per acre (for planting, pruning, and harvesting).
    - **Harvesting and Post-Harvest Handling**: ₹10,000–₹20,000 per acre.
    - **Total Estimated Cost**: ₹80,000–₹1,60,000 per acre, depending on farming practices and scale of operations.
6. **Main Varieties of Pomegranates**:
    - **Bhagwa**: Known for its glossy red skin, soft seeds, and excellent taste. This is the most popular variety for both domestic and export markets.
    - **Ganesh**: Famous for its medium-sized fruits, soft seeds, and rich sweetness.
    - **Arakta**: Recognized for its bright red color and attractive fruit appearance.
    - **Mridula**: High-yielding variety with medium-sized fruits and sweet arils.
    - **Kandhari**: Known for its large fruits, hard seeds, and unique tangy flavor.
    - **Wonderful**: Widely grown for its vibrant color and ability to withstand long-distance transportation.

I.Cercospora Fruit Spot (*Cercospora punicae*):

- Symptoms: Yellowish spots with halos on leaves and fruits, which turn black and corky. Severe infections cause defoliation and fruit cracking.
- Management: Spray fungicides like Hexaconazole (0.1%) or Carbendazim (0.1%).

1) Information

Cercospora Fruit Spot is a fungal disease caused by *Cercospora punicae*. It primarily affects pomegranate leaves, fruits, and twigs, leading to reduced yield and fruit quality. The disease thrives in warm, humid conditions and spreads rapidly during the rainy season. It is a significant concern for pomegranate growers due to its impact on marketable fruit.

2) Disease: Cercospora Fruit Spot

a) Symptoms:

- **Leaves**: Small, circular to irregular dark reddish-brown spots appear, often surrounded by a yellow halo. Severe infections cause leaves to turn pale green, yellow, and eventually fall off.
- **Fruits**: Dark brown to black spots develop on the fruit surface, ranging from 1–12 mm in diameter. These spots may coalesce, forming larger blotches that reduce fruit quality and market value.
- **Twigs**: Black elliptical spots appear, which may become flattened and depressed with raised margins. Infected twigs dry out and die.

b) Cure - Fertilizers:

- **Balanced Nutrition**: Apply fertilizers rich in potassium and phosphorus to strengthen plant resistance.
- **Fungicides**: Use systemic fungicides like Mancozeb (0.25%) or Propiconazole (0.1%) at regular intervals during humid conditions.

c) Prevention:

- Use certified pathogen-free planting material to reduce initial infection.
- Prune and destroy infected leaves, fruits, and twigs to minimize fungal reservoirs.
- Ensure proper plant spacing to improve airflow and reduce humidity.
- Avoid overhead irrigation to prevent water splash, which spreads fungal spores.

d) Causes:

- Caused by the fungus *Cercospora punicae*.
- Thrives in warm, humid conditions with frequent rainfall.
- Spread occurs through wind-borne spores, water splash, and infected plant debris.

3) Pest/Insect

a) Symptoms: Cercospora Fruit Spot is not directly caused by pests, but pests like aphids can weaken plants, making them more susceptible to fungal infections. Symptoms of pest activity include:

- Sticky honeydew secretions on leaves and stems.
- Feeding damage on leaves and twigs.

b) Cure - Fertilizer:

- Use neem-based organic fertilizers to deter pests naturally.
- Apply systemic insecticides like imidacloprid to control aphid populations.
- Promote biological control agents such as ladybugs and lacewings to reduce pest infestations.

4) Nutrition Deficiency

a) Symptoms: Nutritional deficiencies can weaken pomegranate plants, making them more prone to Cercospora Fruit Spot.

- **Nitrogen Deficiency**: Yellowing of older leaves, stunted growth, and reduced foliage.
- **Potassium Deficiency**: Browning or scorching of leaf edges and tips, weak stems, and poor fruit quality.
- **Calcium Deficiency**: Distorted young leaves, yellow or brown spots, and cracking of fruits.

b) Cure - Fertilizer and Compost:

- **Nitrogen Deficiency**: Apply nitrogen-rich fertilizers like urea or ammonium nitrate. Organic options include composted manure or fish emulsion.
- **Potassium Deficiency**: Use potassium sulfate or muriate of potash. Organic alternatives include wood ash or banana peels.
- **Calcium Deficiency**: Add lime, gypsum, or crushed eggshells to the soil. Enrich the soil with calcium-rich compost to improve overall nutrient availability.

II.Anthracnose (*Colletotrichum gloeosporioides*):

- Symptoms: Leaf blight, fruit spots, and dieback. Fruits develop brownish-black patches that lead to rot.
- Management: Use copper fungicides and prune infected branches.

1) Information

Anthracnose is a fungal disease caused by *Colletotrichum gloeosporioides*. It affects pomegranate leaves, fruits, and twigs, leading to significant yield losses and reduced fruit quality. The disease thrives in warm, humid conditions and spreads rapidly during the rainy season. It is a major concern for pomegranate growers due to its impact on marketable fruit.

2) Disease: Anthracnose

a) Symptoms:

- **Leaves**: Small, circular, or irregular dark brown spots appear on leaves, often surrounded by a yellow halo. Severe infections cause leaves to dry out and fall prematurely.
- **Fruits**: Sunken, dark brown lesions develop on the fruit surface, often with concentric rings. These lesions may enlarge, causing fruit cracking and rot.
- **Twigs**: Black streaks or spots appear on twigs, leading to dieback in severe cases.

b) Cure - Fertilizers:

- **Balanced Nutrition**: Apply fertilizers rich in potassium and phosphorus to enhance plant resistance.
- **Fungicides**: Use systemic fungicides like Mancozeb (0.25%) or Propiconazole (0.1%) at regular intervals during humid conditions.

c) Prevention:

- Use disease-free planting material to reduce initial infection.
- Prune and destroy infected leaves, fruits, and twigs to minimize fungal reservoirs.
- Ensure proper plant spacing to improve airflow and reduce humidity.

- Avoid overhead irrigation to prevent water splash, which spreads fungal spores.

d) Causes:

- Caused by the fungus *Colletotrichum gloeosporioides*.
- Thrives in warm, humid conditions with frequent rainfall.
- Spread occurs through wind-borne spores, water splash, and infected plant debris.

3) Pest/Insect

a) Symptoms: Anthracnose is not directly caused by pests, but pests like aphids can weaken plants, making them more susceptible to fungal infections. Symptoms of pest activity include:

- Sticky honeydew secretions on leaves and stems.
- Feeding damage on leaves and twigs.

b) Cure - Fertilizer:

- Use neem-based organic fertilizers to deter pests naturally.
- Apply systemic insecticides like imidacloprid to control aphid populations.
- Promote biological control agents such as ladybugs and lacewings to reduce pest infestations.

4) Nutrition Deficiency

a) Symptoms: Nutritional deficiencies can weaken pomegranate plants, making them more prone to Anthracnose.

- **Nitrogen Deficiency**: Yellowing of older leaves, stunted growth, and reduced foliage.
- **Potassium Deficiency**: Browning or scorching of leaf edges and tips, weak stems, and poor fruit quality.
- **Calcium Deficiency**: Distorted young leaves, yellow or brown spots, and cracking of fruits.

b) Cure - Fertilizer and Compost:

- **Nitrogen Deficiency**: Apply nitrogen-rich fertilizers like urea or ammonium nitrate. Organic options include composted manure or fish emulsion.

- **Potassium Deficiency**: Use potassium sulfate or muriate of potash. Organic alternatives include wood ash or banana peels.
- **Calcium Deficiency**: Add lime, gypsum, or crushed eggshells to the soil. Enrich the soil with calcium-rich compost to improve overall nutrient availability.

III.Alternaria Leaf Spot (*Alternaria alternata*):

- Symptoms: Circular brown spots on leaves, leading to defoliation.
- Management: Apply Mancozeb or Chlorothalonil sprays.

1) Information

Alternaria Leaf Spot is a fungal disease caused by *Alternaria alternata*. It primarily affects pomegranate leaves, fruits, and stems, leading to reduced photosynthesis, premature defoliation, and poor fruit quality. The disease thrives in warm, humid conditions and spreads rapidly during the rainy season or in areas with prolonged leaf wetness.

2) Disease: Alternaria Leaf Spot

a) Symptoms:

- **Leaves**: Small, circular to irregular dark brown or black spots appear on leaves, often surrounded by a yellow halo. Severe infections cause leaves to dry out and fall prematurely.
- **Fruits**: Dark, sunken spots develop on the fruit surface, which may coalesce into larger blotches, reducing market value.
- **Stems**: Lesions may appear on stems, leading to dieback in severe cases.

b) Cure - Fertilizers:

- **Balanced Nutrition**: Apply fertilizers rich in potassium and phosphorus to enhance plant resistance.
- **Fungicides**: Use fungicides like Mancozeb (0.25%) or Chlorothalonil (0.2%) at regular intervals during humid conditions.

c) Prevention:

- Use certified disease-free planting material to reduce initial infection.

- Prune and destroy infected leaves, fruits, and twigs to minimize fungal reservoirs.
- Ensure proper plant spacing to improve airflow and reduce humidity.
- Avoid overhead irrigation to prevent water splash, which spreads fungal spores.

d) Causes:

- Caused by the fungus *Alternaria alternata*.
- Thrives in warm, humid conditions with prolonged leaf wetness.
- Spread occurs through wind-borne spores, water splash, and infected plant debris.

3) Pest/Insect

a) Symptoms: Alternaria Leaf Spot is not directly caused by pests, but pests like aphids can weaken plants, making them more susceptible to fungal infections. Symptoms of pest activity include:

- Sticky honeydew secretions on leaves and stems.
- Feeding damage on leaves and twigs.

b) Cure - Fertilizer:

- Use neem-based organic fertilizers to deter pests naturally.
- Apply systemic insecticides like imidacloprid to control aphid populations.
- Promote biological control agents such as ladybugs and lacewings to reduce pest infestations.

4) Nutrition Deficiency

a) Symptoms: Nutritional deficiencies can weaken pomegranate plants, making them more prone to Alternaria Leaf Spot.

- **Nitrogen Deficiency**: Yellowing of older leaves, stunted growth, and reduced foliage.
- **Potassium Deficiency**: Browning or scorching of leaf edges and tips, weak stems, and poor fruit quality.
- **Calcium Deficiency**: Distorted young leaves, yellow or brown spots, and cracking of fruits.

b) Cure - Fertilizer and Compost:

- **Nitrogen Deficiency**: Apply nitrogen-rich fertilizers like urea or ammonium nitrate. Organic options include composted manure or fish emulsion.
- **Potassium Deficiency**: Use potassium sulfate or muriate of potash. Organic alternatives include wood ash or banana peels.
- **Calcium Deficiency**: Add lime, gypsum, or crushed eggshells to the soil. Enrich the soil with calcium-rich compost to improve overall nutrient availability.

IV.Bacterial Blight (*Xanthomonas axonopodis pv. punicae*):

- Symptoms: Dark lesions on fruits, leaves, and stems, often with cracks.
- Management: Prune infected parts and apply copper-based sprays.

1) Information

Bacterial Blight is a bacterial disease caused by *Xanthomonas axonopodis pv. punicae*. It is one of the most devastating diseases affecting pomegranate cultivation, leading to significant yield losses and reduced fruit quality. The disease thrives in warm, humid conditions and spreads rapidly during the rainy season. It can cause up to 70–90% yield losses if not managed effectively2.

2) Disease: Bacterial Blight

a) Symptoms:

- **Leaves**: Small, dark brown to black water-soaked lesions appear on leaves, often surrounded by a yellow halo. Severe infections cause leaves to dry out and fall prematurely.
- **Fruits**: Dark, sunken spots develop on the fruit surface, which may crack and ooze bacterial slime. Fruits become unmarketable due to rot and discoloration.
- **Twigs**: Black streaks or lesions appear on twigs, leading to dieback in severe cases.

b) Cure - Fertilizers:

- **Balanced Nutrition**: Apply fertilizers rich in potassium and phosphorus to enhance plant resistance.
- **Bactericides**: Use copper-based bactericides or streptomycin sprays to manage bacterial infections. Apply sprays during early fruit development.

c) Prevention:

- Use certified disease-free planting material to prevent seedborne transmission.
- Prune and destroy infected leaves, fruits, and twigs to minimize bacterial reservoirs.
- Ensure proper plant spacing to improve airflow and reduce humidity.
- Avoid overhead irrigation to prevent water splash, which spreads bacterial pathogens.

d) Causes:

- Caused by the bacterium *Xanthomonas axonopodis pv. punicae*.
- Thrives in warm, humid conditions with frequent rainfall.
- Spread occurs through contaminated seeds, water splash, wind, and infected plant debris.

3) Pest/Insect

a) Symptoms: Bacterial Blight is not directly caused by pests, but pests like aphids can weaken plants, making them more susceptible to bacterial infections. Symptoms of pest activity include:

- Sticky honeydew secretions on leaves and stems.
- Feeding damage on leaves and twigs.

b) Cure - Fertilizer:

- Use neem-based organic fertilizers to deter pests naturally.
- Apply systemic insecticides like imidacloprid to control aphid populations.
- Promote biological control agents such as ladybugs and lacewings to reduce pest infestations.

4) Nutrition Deficiency

a) Symptoms: Nutritional deficiencies can weaken pomegranate plants, making them more prone to Bacterial Blight.

- **Nitrogen Deficiency**: Yellowing of older leaves, stunted growth, and reduced foliage.
- **Potassium Deficiency**: Browning or scorching of leaf edges and tips, weak stems, and poor fruit quality.
- **Calcium Deficiency**: Distorted young leaves, yellow or brown spots, and cracking of fruits.

b) Cure - Fertilizer and Compost:

- **Nitrogen Deficiency**: Apply nitrogen-rich fertilizers like urea or ammonium nitrate. Organic options include composted manure or fish emulsion.
- **Potassium Deficiency**: Use potassium sulfate or muriate of potash. Organic alternatives include wood ash or banana peels.
- **Calcium Deficiency**: Add lime, gypsum, or crushed eggshells to the soil. Enrich the soil with calcium-rich compost to improve overall nutrient availability.

V.Pomegranate Mosaic Virus:

- Symptoms: Mosaic patterns on leaves, stunted growth, and reduced fruit quality.
- Management: Control aphids and use virus-free planting material.

1) Information

Pomegranate Mosaic Virus is a viral disease that affects pomegranate plants, causing discoloration, stunted growth, and reduced fruit quality. The virus is transmitted by sap-sucking insects like aphids and whiteflies. It thrives in warm climates and spreads rapidly under favorable conditions, leading to significant economic losses.

2) Disease: Pomegranate Mosaic Virus

a) Symptoms:

- **Leaves**: Yellow, white, or green streaks, stripes, or spots appear on the foliage. Leaves may become wrinkled, curled, or smaller in size.
- **Fruits**: Infected fruits may show mottled patterns, discoloration, and raised, warty areas.
- **Plants**: Stunted growth, reduced vigor, and lower yields are common.

b) Cure - Fertilizers:

- There is no direct cure for viral infections, but maintaining plant health can reduce the impact of the disease.
- Apply balanced fertilizers rich in potassium and phosphorus to strengthen plant resistance.

c) Prevention:

- Use virus-free planting material to minimize initial infection.
- Control vector populations (aphids, whiteflies) using insecticides or biological agents.
- Remove and destroy infected plants to prevent the spread of the virus.
- Avoid planting pomegranates near infected fields to reduce the risk of transmission.

d) Causes:

- Caused by the **Pomegranate Mosaic Virus**.
- Transmitted by sap-sucking insects like aphids and whiteflies.
- Spread occurs through infected plant material, contaminated tools, and insect vectors.

3) Pest/Insect

a) Symptoms: Pests like aphids and whiteflies are the primary vectors of the Pomegranate Mosaic Virus. Symptoms of pest activity include:

- Sticky honeydew secretions on leaves and stems.
- Clusters of aphids or whiteflies feeding on plant sap.

b) Cure - Fertilizer:

- Use neem-based organic fertilizers to deter pests naturally.
- Apply systemic insecticides like imidacloprid or dimethoate to control pest populations.

- Promote biological control agents such as ladybugs and lacewings to reduce pest infestations.

4) Nutrition Deficiency

a) Symptoms: Nutritional deficiencies can weaken pomegranate plants, making them more prone to viral infections.

- **Nitrogen Deficiency**: Yellowing of older leaves, stunted growth, and reduced foliage.
- **Potassium Deficiency**: Browning or scorching of leaf edges and tips, weak stems, and poor fruit quality.
- **Calcium Deficiency**: Distorted young leaves, yellow or brown spots, and cracking of fruits.

b) Cure - Fertilizer and Compost:

- **Nitrogen Deficiency**: Apply nitrogen-rich fertilizers like urea or ammonium nitrate. Organic options include composted manure or fish emulsion.
- **Potassium Deficiency**: Use potassium sulfate or muriate of potash. Organic alternatives include wood ash or banana peels.
- **Calcium Deficiency**: Add lime, gypsum, or crushed eggshells to the soil. Enrich the soil with calcium-rich compost to improve overall nutrient availability.

VI.Root Rot:

Caused by waterlogging or poor drainage, leading to root decay.

1) Information

Root Rot is a fungal disease caused by pathogens such as *Phytophthora*, *Fusarium*, *Rhizoctonia*, and *Pythium* species. It primarily affects the root system of pomegranate trees, leading to decay, reduced nutrient uptake, and eventual plant death. The disease thrives in poorly drained, waterlogged soils and spreads rapidly under favorable conditions.

2) Disease: Root Rot

a) Symptoms:

- **Roots**: Roots appear mushy, dark, and decayed, often emitting a foul odor.
- **Leaves**: Yellowing, wilting, and premature leaf drop are common.
- **Plant Growth**: Stunted growth and reduced vigor.
- **Advanced Stage**: Entire plant may wilt and die if untreated.

b) Cure - Fertilizers:

- **Balanced Nutrition**: Apply fertilizers rich in potassium and phosphorus to strengthen plant resistance.
- **Fungicides**: Use systemic fungicides like Metalaxyl or Phosphonate-based products to treat infected plants.

c) Prevention:

- Ensure proper soil drainage to avoid waterlogging.
- Avoid overwatering and maintain optimal irrigation practices.
- Use disease-free planting material and resistant rootstocks.
- Incorporate organic matter like compost to improve soil structure and aeration.

d) Causes:

- Caused by soilborne fungi such as *Phytophthora*, *Fusarium*, *Rhizoctonia*, and *Pythium*.
- Thrives in poorly drained, waterlogged soils.
- Spread occurs through contaminated soil, water, and infected plant debris.

3) Pest/Insect

a) Symptoms: Root Rot is not directly caused by pests, but pests like root-knot nematodes can damage roots, making them more susceptible to fungal infections. Symptoms of pest activity include:

- Galls or knots on roots.
- Stunted growth and yellowing leaves.

b) Cure - Fertilizer:

- Use neem-based organic fertilizers to deter nematodes naturally.

- Apply biological controls like beneficial nematodes to reduce harmful nematode populations.
- Maintain soil health with organic amendments to suppress nematode activity.

4) Nutrition Deficiency

a) Symptoms: Nutritional deficiencies can weaken pomegranate plants, making them more prone to Root Rot.

- **Nitrogen Deficiency**: Yellowing of older leaves, stunted growth, and reduced foliage.
- **Potassium Deficiency**: Browning or scorching of leaf edges and tips, weak stems, and poor fruit quality.
- **Calcium Deficiency**: Distorted young leaves, yellow or brown spots, and cracking of fruits.

b) Cure - Fertilizer and Compost:

- **Nitrogen Deficiency**: Apply nitrogen-rich fertilizers like urea or ammonium nitrate. Organic options include composted manure or fish emulsion.
- **Potassium Deficiency**: Use potassium sulfate or muriate of potash. Organic alternatives include wood ash or banana peels.
- **Calcium Deficiency**: Add lime, gypsum, or crushed eggshells to the soil. Enrich the soil with calcium-rich compost to improve overall nutrient availability.