



all about

Pomegranate

POMEGRANATE

Disclaimer :The information on performance of recommendations given in this book holds good only when used under optimum conditions. Their performance may either change in due course of time due to several factors or can vary under different systems of management. Mishandling/negligence of the user can also result in damage/loss/non-reproducibility of results. In this regard, HPSHIVA team accepts no legal responsibilities.

Himachal Pradesh Subtropical Horticulture, Irrigation & Value Addition (HPSHIVA) Project, was conceived to harness the potential of horticulture in the subtropical climate area of the state.

The main objective of HPSHIVA project is development of sub-tropical horticulture on commercial lines in cluster approach besides providing sustainable livelihood opportunities to the farmers, who have abandoned their cultivable land because of menace of stray animals, monkeys & wild animals and to the youth population migrating to urban areas to seek wages employment.

The project is being implemented by Department of Horticulture (DoH) and Jal Shakti Vibhag (JSV) as implementing agency with the financial assistance from Asian Development Bank (ADB).

As part of consultancy services under the project, “Package of Practices” for the mandated fruit crops of HPSHIVA Project was developed by a team of experts from Dr. YSP University of Horticulture & Forestry ,COHF- Neri, Hamirpur.

The booklet is an abridged version of PoP developed specifically for **Pomegranate**.

Climate

Pomegranate is one of the most robust fruit, grown in a wide range of climate i.e., tropical, subtropical, arid and temperate regions. It can be grown successfully up to an altitude of 1200m above mean sea level. Pomegranate behaves as deciduous in temperate regions and evergreen or partially defoliated in tropical and subtropical areas, which also varies with cultivar. Annual rainfall of 1,000 mm with long, hot and dry summer and mild winter are conducive for its growth. The optimum temperature of 38°C is considered ideal during fruit development and maturity. However, pomegranate can easily endure temperatures up to 48°C along with desiccating winds.

Topography and soil

Pomegranate performs best in deep, alluvial soils and grown successfully in sandy to sandy loam soil. Light soils having pH 6.5 to 7.0, electrical conductivity 0.5 to 1.5 dsm⁻¹ and organic carbon >1.0 percent are considered ideal for pomegranate cultivation. Pomegranate produces good quality coloured fruits in light soils. Undulated topography is common on hills of the state, so contour / terrace planting should be done at least in one-meter wide strip.

Recommended cultivars

Bhagwa : Bhagwa is one of the most important cultivar grown in Himachal Pradesh on account of its dark red arils, attractive red coloured skin, soft seeded aril, good sugar:acid blend of juice and 13-140B TSS. The fruits become ready for harvesting within 170- 180 days after full bloom.



Propagation

Pomegranate plants are mostly multiplied through cutting however in southern parts of the country, pomegranate is propagated through air-layering. In North India, where pomegranate behaves as deciduous plant, it is propagated mainly by

hardwood cuttings. Pomegranate plants multiplied through vegetative means viz., stem cuttings and air layering are susceptible to challenging diseases and pests of pomegranate like bacterial blight, wilt and nematodes. Therefore, the production of quality planting material free from these maladies is of utmost importance. Nowadays, plant production through tissue culture technique has become more popular as the tissue cultured plants are uniform and free from insect-pest and diseases.

Cuttings (Hardwood)

Pomegranate plants are successfully multiplied by hardwood and semi-hardwood cuttings under mist system. Semi-hard wood cuttings of 6 month to one year old, pencil thickness and 20-25 cm length perform better. Hard-wood or semi-hard wood cutting planted during winter season gives higher success rate. Under North Indian conditions cuttings are planted in February and July under mist system. In July, cutting should not be taken from the lateral branches producing flowers and fruits.

Pomegranate cuttings dipped in IBA (2500 ppm) for 5 minutes produce fibrous root system, which helps in better establishment of plants under field conditions. Pomegranate cuttings planted in different media viz., mixture of cocopeat and sand (4:1) or cocopeat alone promotes fast rooting and performs better. While planting, we should always treat and sanitize the cuttings with Antimicrobial compound 2-bromo-2-nitro-1,3-diol @ 500mg/litre (0.5g/litre) + carbendazim @ 1.0 g/litre for 5 minutes to reduce pests and disease infection.

Tissue culture

The demand of quality planting material of pomegranate is increasing day by day, for which large scale multiplication of pomegranate plants through tissue culture is required and it is highly successful in pomegranate. Tissues culture plants are free from all kind of infection (nematodes, wilt and bacterial blight) and are true-to-type. Synchronized flowering and fruiting make tissue cultured plants more suitable for mechanical cultivation which results in better quality and high yield. It provides disease-free planting material for introduction of pomegranate to non-traditional areas. Although, this technology requires high initial investment, more care and skilled man power.



Pomegranate Cuttings



Root trainer raised cuttings



Pomegranate Nursery

Layout and Planting

Spacing

Pomegranate should be planted at 3.0m × 3.0m spacing, accommodating 1,111 plants/ha of Bhagwa.

Layout

Pomegranate plants should be planted in square or rectangular planting systems. The orientation of the plants should be in North–South direction.



Field Preparation



Field Layout



Pit Layout

Preparation of field, bed, planting pit and filling

- Deep ploughing should be done and raised bed (2-meter- wide at bottom × 1.5-meter-wide at top × 45 cm height) should be prepared one month before planting.
- In hilly terrain, contour/terrace (1meter width) system of planting should be adopted on undulated sloppy topography.
- A pit size of 60 × 60 × 60 cm size for planting should be dug one month before planting and exposed to intense solar radiation.
- Pit should be filled with mixture of top soil, farmyard manure (20kg), neem cake (1kg) and single super phosphate (500g).
- Irrigation must be provided immediately after filling the pits to allow soil to settle.
- Planting can be done during winters or rainy season.
- Staking with wooden sticks should be provided to keep the young plants straight and avoiding damage of shoots by winds. Use 60-80 cm long wooden sticks and tie the main branches. Wooden sticks should be dipped in chloropyriphos (2ml/l) solution for termite protection.



Raised Bed Technology



Preparation of Pit

Canopy Management

Training and Pruning

Multi-stem training system

- Healthy saplings of 5-6 months old age should be planted and trained in multi-stem training system (3-4 stems) to avoid losing stems/plants due to infestation by stem borer or any other disease.
- Training operation to develop structural framework should start after 3 months of planting, when plants attain a height of 45-60 cm which may vary from place to place
- For multi-stem system, 3-4 healthy suckers should be allowed to develop and other suckers must be removed regularly.
- All the branches up to 30 cm height should be removed.
- During the second phase, select 3-5 primary branches above 30 cm height in all directions. The selection of primary and secondary branches should remain continuous during the next year up to February month.
- The orientation of primary branches should be toward peripheral canopy at about 60° angles with stem.



Pruning

- Pruning should be done during winter months by removing dried twigs, inter-mingled branches, water shoots and sprouts.
- All upright growing shoots should be removed during growing period.
- To induce cropping, heading back of tertiary branches/shoots of 5 mm thickness should be practiced during winters.
- Hard pruning of thick shoots should be discouraged.
- Major pruning is practiced during winter months and light pruning of new growth should be done during fruit setting by removing all the new water shoots and water sprouts.
- Immediately after training and pruning, apply Bordeaux paste on the cut ends (>10 mm thickness) of the plants.

Operations to be done during pre-pruning & pruning

- Spray 1.0 % Bordeaux mixture 2 days before defoliation.
- Prune the twigs carefully.
- Sterilize the secateurs with sodium hypochlorite (2 to 3 ml/l), frequently.
- Remove weeds and suckers.
- The fallen leaves/pruned shoots from the orchard must be collected and burnt.

Pollination

The major crop of pomegranate in the subtropics of Himachal Pradesh should be taken from the flower flush of April-May (Ambe bahar). The flowers opening from June onwards should be removed as they appear. The flowers are on current year's growth found mostly in clusters, terminal or in axils of the leaves. Pomegranate plants carry hermaphrodite, intermediate and staminate flowers in three flushes on new and old growth. The females can be identified by the miniature fruit/bulged structure at the flower base which is the swollen ovary at the base of the bloom.

Orchard management

- The bed should be covered with mulch to check the weed population, conserve the soil moisture and regulate soil temperature. Preferably organic mulching having 15-20 cm thick layer of uprooted weeds and dry grasses from the field is considered economic and better for quality of the produce. Apply mulch to cover the root zone in accordance to the spacing of plantation around the tree, keep mulch 10-30 cm away from the trunk. Mulching should be done in the month of February which helps in conserving moisture and reducing weed growth.
- During the initial two to three years, the intercropping of different annual crops which do not compete with main crop can be undertaken as mentioned in the table to get additional income during initial years.
- Intercultural activities like weeding, irrigation and de-suckering should be performed regularly. Fast growing and non-productive suckers should be removed as early as possible so as to reduce the competition for nutrition, irrigation and light.
- The pomegranate orchards must be kept neat and clean from weeds as they may act as alternate host for several insect-pest and diseases.
- Collect the dried infected fruits and twigs regularly and burn them properly to reduce the disease and pest inoculum in the orchard.

Crops recommended for intercropping under high density planting

Sr. No.	Crops	Inter Crops	Not be grown as Intercrops
1	Vegetable	Cabbage, Cauliflower, Pea, Broccoli, Radish	Potato, Tomato, Brinjal, Okra, Cucumber, Pumpkin, Bottleguard, Bittergaurd, Parval, Colocasia, Chilli, Capsicum
2	Spices	Turmeric, Ginger, Onion, Garlic, Coriander, Fennel, Fenugreek	
3	Legumes	Lentil, Horse Gram (Kulth)	Beans, Soyabean, Blackgram (Urd), Greengram (Moong), Kideybeen (Rajmash), Chickpea
4	Leafy Vegetable	Mustard, Spinach (Palak), Chino podium, Coriander, Fennel, Fenugreek	
5	Fodder corps	Barley, Oat	Barseem, Jawar, Bajara
6	Cereals Crops/Oilseeds	Wheat, Barley, Linseed	Maize, Sugarcane, Ragi
7	Flowers	Marigold, Gladiolus	-

Nutrition management

Manure

Well decomposed FYM should be applied along with 50% P through single super phosphate (SSP) in the basin by band placement during winter months before mid-February.

Age of plant (year)	1st	2nd	3rd	4th	5 th year onwards
FYM (kg plant ⁻¹)	10	10	15	20	20

Nutrient recommendation

The quantity of nutrients to be applied in through fertilizers HD orchard of pomegranate mainly depends on the age of plant, condition of plant and soil type. The nutrient dose (g/tree) should be divided equally among the number of splits and applied at weekly intervals. For proper growth and higher yield, following nutrient doses should be applied:

Fertigation Schedule for first 18 months (Till first Flowering)

1-18 Months Oct. to March (Days)	Duration (Days)	N=375g/Tree	P=187g/tree	K=166g/tree
October-December	90	42	21	20.5
January-March	90	42	21	20.5
April-June	90	83	42	31.3
July-September	90	83	42	31.3
October-December	90	62.5	30.5	31.3
January-March	90	62.5	30.5	31.3

Fertigation schedule for 19-24 months (Till first harvest)

19-24 Months April to September (Days)	Duration (Days)	N=63 g/Tree	P=62g/tree	K=146g/tree
April-Mid May	45	21	31	31
Mid May-June	45	21	31	31
July-August	60	21	0	84

Fertigation Schedule for first 18 months (Till first Flowering)

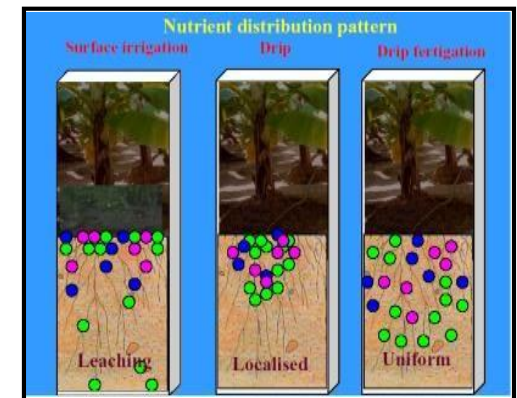
25-36 Months	Duration (Days)	N=625 g/Tree	P=250g/tree	K=300 g/tree
October-December	45	187.5	100	25
November-December	45	No need of fertigation and irrigation		
January- February	58	187.5	75	50
March- May	90	187.5	75	75
June-July	90	62.5	0	75
August	30	0	0	75

Cropping

In hilly terrains of Himachal Pradesh, single crop of pomegranate w.e.f., August to October depending upon the altitude/microclimate is being taken up by the farmers on account of deciduous behaviour of the plants in Northern India.

For better fruit set and cropping micronutrients should be applied as foliar spray of 0.2% (2g/litre) solution of the needed nutrient (two sprays in April at 15 days interval).

Recommended soil application rates of chelated micronutrients are: about 20g borax, 20g copper sulphate, 20g manganese sulphate, 20g iron, 20g zinc sulphate and 40g magnesium sulphate per tree per year in February along with FYM application.

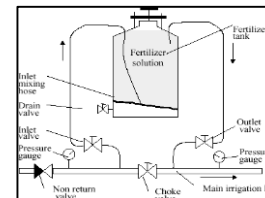


Nutrient distribution pattern

Irrigation Management

Pomegranate requires regular optimum moisture regime in the rhizosphere right from flowering to harvesting. The water requirement of crop development and maturity period ranges from 28-45 litre/tree/biweekly. Excess or deficit moisture situation lead to cracking of fruit along with poor yield and quality. So, uniform moisture in between field capacity and wilting point is optimum. Fertigation is the most efficient way of supplying water and nutrients to the plant roots. In this, the inputs are effectively utilized by plants as these are placed near crop root zone.

The drip line should be laid out at the time of planting of orchard with two drip lines having two inline drippers at 50 cm apart each in the plant basin with 4.5 lph discharge. There should be a control unit/valve for each farmer holdings.



Irrigation scheduling

Irrigation (litres per tree biweekly*) schedule for Pomegranate

Period	Age of plant (Years)				
	1	2	3	4	5
October	1	2	4	10	18
November	0.75	1.5	3	8	16
December	0.75	1.5	3	8	16
January	1.5	3	5	12	25
February	1.5	3	6	12	25
March	1.5	3	7.5	12	25
April	1.5	4	7.5	15	30
May	2	5	10	18	35
June	3	6	14	20	35
July**	2	3	7.5	15	25
August**	2	3	6	12	20
September**	1.5	2	6	12	20

- Approx. Amount of irrigation water may vary by 10-15 percent depending upon soil, climate and prevailing weather conditions.

** During Rainy season from July to Sept sufficient rainfall occurs in the subtropics of the state. Therefore, under such situations there is no need of irrigating the crops except in the event of failure of the monsoon. During rainy season moisture content underneath the mulch should be maintained at optimum level. Irrigation should be given once in a week on the basis of soil moisture content keeping in view of the rains due to western disturbances.

Harvesting

Maturity indices

Being a non-climacteric fruit, pomegranate fruits should be harvested after achieving proper maturity.

Sr. No.	Maturity Indices	Attributes
1	Fruit Colour	Reddish with waxy shining surface
2	Shape of crown and fruit	The bud at the anterior end of the fruit gets curved inside and becomes hard and dry at maturity. The fruit shape becomes compact
3	Sound	The fruit gives a metallic sound when tapped.
4	Scratch	Properly mature fruits are easily scratched with finger nails
5	Maturity Period	The fruits become ready for harvest in 170-180 days after full bloom
6	Aril Colour	The arils attain deep intensity of colour (Dark red- Bhagwa) with high juice recovery
7	Juice Colour	Red colour of juice in Bhagwa
8	TSS	12-14 ^o Brix
9	Titratable Acidity	Below 0.8%
10	TSS/acid ratio	It is one of the most reliable maturity indicators. Mature fruit have TSS/ acid ratio between 25 to 40

Harvesting, grading and packaging

- The fruit crop in pomegranate should be taken from second year onwards so as to allow proper growth and development of plants.
- Secateurs must be used for fruit harvesting at right maturity.
- After harvesting, the fruits should be collected in plastic crates and should be pre-cooled to remove the field heat and enhance the shelf life. Then, the fruits are graded and packed in Corrugated Fibre Board boxes. Grading is done to obtain a reasonable price in market. Cracked, damaged, diseased and infested fruits should be removed. The fruits are graded on the basis of their size, external appearance and quality.

Crop and grade regulation

- A grown-up, well managed tree at three years age gives 80-100 fruits annually, and increases by ten percent annually of which 8-10% are of 'A' grade; 20-25% are of 'B' grade and the remaining are of 'C' and 'D' grades and cracked fruits. However, fully grown tree (4-5 years age) produces approximately 100-150 fruits per plants.
- After the fruit set, do not allow fruits to develop in clusters and keep only solitary fruits.
- Allow flower set on inner/thicker shoots to develop in to fruits, remove those which are developed terminally on weaker shoots.
- After fruit set, remove all the flowers coming thereafter.

Requirements for export:

Pomegranate must be carefully picked and have reached an appropriate degree of development and ripeness in accordance with criteria proper to the variety and/or commercial type and to the area in which they are grown. The development and condition of the pomegranate must be such as to enable them to withstand transport and handling, and to arrive in satisfactory condition at the place of destination. Size is determined in accordance with the weight or maximum diameter of the equatorial section of the fruit as shown in table below.

Yield

A fully-grown pomegranate tree of 5-6 years age will produce 200-250 fruits per plant under optimum management conditions.

Size code	Weight in grams (min)	Diameter in mm. (min)	Skin Colour and quality
A	400	90	Good attractive bright red colour and no spots on skin
B	350	80	Attractive red colour and spot free
C	300	70	Bright red and spot free
D	250	60	Fully ripe bright red and spot free
E	200	50	Fully ripe bright red and spot free

Provisions concerning sizing for export of pomegranate

Diseases

Cercospora Leaf Spot

Causal organism: *Pseudocercospora punicae*

Symptoms

- On leaves and fruits, light zonate brown spots appear.
- These leaf spots are minute, brown in colour with yellow halo.
- Spots are scattered, circular or irregular and become dark brown with age.
- Spots on lower side are sunken with grey colour due to clusters of spore bearing structures.



Pomegranate cercospora spot on leaf and Fruits

- On sepals of the flower, minute, circular, black spots appear.
- On Fruit, black, minute and circular spots appear on rind.
- Market value of fruits is reduced as the spots grow old, become large, irregularly circular and depressed presenting an ugly look to the fruits.
- Black and elliptic spots appear on the twigs.
- The affected areas in the twigs dry up as become flattened and depressed with raised edge.
- Whole plant dies in severe cases.

Disease cycle and Epidemiology

- Infected leaves and diseased plant debris serve as primary source of inoculum
- Wind born conidia serve as secondary source of inoculum.
- The disease is serious during high humidity periods with temperature ranging between 20 and 27oC.

Management:

Cultural Methods

- Collect and destroy infected plant debris

Chemical methods

- Spray Carbendazim 1g/litre or Hexaconazole 1 ml/litre or Propiconazole 1 ml/litre and repeat at 10 to 14 days interval.

Bacterial Blight

Causal organism: *Xanthomonas axonopodis* pv *Punicae*

Symptoms

- On leaves one to several small water soaked, dark coloured irregular spots appear leading to premature defoliation in severe cases.
- Size of the spot varies from two to five mm in diameter consisting of necrotic centre of pin-head size.
- Spots are translucent which later turn light brown to dark brown and are surrounded by prominent water-soaked margins. Spots coalesce and give rise to large patches.
- Infection also occurs on stem and branches. Branches break down.
- Girdling and cracking of nodes occur on the stem following the brown to black spots around the nodes.
- Dark brown, irregular slightly raised spots with oily appearance are formed on fruits, which split open with L-shaped cracks under severe cases.



Host range: Pomegranate is the only natural host of this bacterium

Disease cycle and Epidemiology

- The bacterium survives on the tree.
- The pathogen survives for 120 days on the fallen leaves during the season.
- The primary infection is through infected cuttings and disease spreads through wind splashed rains.
- High temperature and low humidity favour the disease. Temperature of 30 to 34°C, relative humidity of 80 to 85% is favourable for multiplication of pathogen.
- Continuous/intermittent rainfall for a longer period, maximum temperature between 29.4 to 35.6°C and minimum temperature between 19.5 to 27.3°C and relative humidity from 63 to 87 % are favourable for the development and spread of the disease.

Management:

Cultural methods

- Pruning at correct stage would reduce the disease.
- Clean cultivation and strict sanitation is useful to reduce the disease incidence.
- Collect and burn the fallen leaves
- Spraying of 1 per cent urea solution to fallen leaves enhances the degradation
- Bleaching on to the fallen leaves reduces the inoculum

Chemical methods

- Spraying with Bordeaux mixture 1.0% (10g each of copper sulphate and lime / liter of water) or streptomycin@ 0.05% (0.5g per litre of water) or copper oxychloride at 0.3% (3 g per litre of water) controls the disease.

Anthracnose

Causal organism: *Colletotrichum* spp.

Symptoms

- Symptoms appear as small regular or irregularly shaped light violet or black leaf spots with yellow halos.
- Leaves initially turn yellow and then fall out.
- Symptoms appear on flowers as well.
- Both young and mature fruits develop spots which are initially circular, turning irregular with sunken centres, brown to dark brown and cover the fruit partly or completely.
- Minute, black dots representing acervuli are clearly visible on the fruits.



Disease cycle and Epidemiology

- The pathogen survives in affected plant parts as dormant mycelia
- Spreads through airborne conidia produced in acervulus.
- Mode of entry is through stomata
- The disease is severe during the months of August-September when relative humidity is high and the temperature ranges between 20-27°C

Management:

Cultural methods

- Removal of infected plant debris.
- On fallen leaves or affected plant parts, spray nitrogen solution or bleaching powder to enhance degradation.
- Pruning and burning of all affected branches followed by application of Bordeaux paste or Copper oxychloride paste on cut ends.

Chemical methods

- Spray the crop with systemic fungicides like Hexaconazole @1ml/litre or Carbendazim @ 1g/litre and repeat at 20 days interval.
- Foliar spray with Mancozeb (2.5 g /l) is also equally effective.

Fruit Rot

Causal organism: *Alternaria alternata*

Host range: Strawberry, hazelnut, pomegranate, date palm, kiwi, persimmon, okra, onion spinach, Amaranthus and many more

Symptoms

- Alternaria fruit rot is also known as black heart.
- Wounds must occur after flower initiation for the infections to occur.
- On fruits, small reddish-brown circular spots appear. As the disease progresses, these spots coalesce to form larger patches and the fruits start rotting.
- The arils get affected which become pale brown to black and become unfit for consumption.



Disease cycle and Epidemiology

- Alternaria species survive in diseased plant debris and can persist for one to two years.
- Primary infection takes place through conidia formed on crop debris in soil.
- Conidia developed on primary spots serve as secondary source of inoculum.
- Wind, water and insects help the conidia to disperse to the neighbouring leaves\ plants.
- The optimum temperature for infection of for A. Alternate ranges between 20-25oC.

Management:

Cultural methods

- All the affected fruits should be collected and destroyed

Chemical methods

- Spraying mancozeb @ 0.25% (2.5 g / litre) effectively controls the disease

Insect Pest Management

Important insect-pests infesting pomegranate in sub tropical zone of Himachal Pradesh are listed below:

Pomegranate butterfly / Anar butterfly *Deudorix Isocrates* **Lycaenidae: Lepidoptera**

Host

It is the most important and destructive pest of pomegranate and distributed throughout the country, also infesting guava, annona, apple, ber, citrus, litchi, tamarind, wood apple, soap nut, etc.

Symptoms & Damage

- Offensive smell and excreta of caterpillar at the entry hole.
- The affected fruits ultimately falling down.
- The fruit appears healthy but the caterpillar inside feeds on pulp and seeds just below the rind. It is only when the grown up caterpillar comes out, a round hole is seen through which juices come out.
- Feeding injury also causes rotting of the fruits. Up to 50% fruit damage is observed.



Infested Fruit

Life Cycle

- Butterfly is bluish brown with an orange spot on each of the forewings and black spots on the hindwings with a tail like extension at the lower margin of hindwings.
- It is active in bright sun.
- Eggs are laid singly on calyx of flowers or tender fruits. Egg period is 7-10 days.
- Caterpillar is stoutly built dirty brown in colour, with light patches, a few short hairs and measures about 16-20 mm long.
- Larva after hatching bores into the fruit and feeds on the seeds. Entry hole heals up.
- A single fruit may harbour half a dozen caterpillars.
- Larval period is 18-47 days. The full grown larva comes out, secures the stalk of the fruit to the stem with a silky secretion, returns to inside of fruits and pupates on fruit stalk.
- Pupal period 7-34 days. Total life cycle takes about 1-2 months. There may be 4 overlapping generations in a year.

Management

- Destruction of fallen infested fruits checks the spread.
- Removal of flowering weeds especially of Compositae family.
- Though expensive, bagging of fruits with polythene or paper bags or cloth bags soon after the fruit set prevents the pest attack.
- Initiate the spray schedule with the onset of flowering with any of following insecticides:
- Cypermethrin (1ml/l) or spinosad (0.2ml/l) chlorantraniliprole (0.3ml/l) or indoxacarb (0.25ml/l)
- Repeat the spray at 15-20 day interval.
- About 3 to 4 sprays are needed for effective control of the pest, as it continues to attack flowers (flowering in pomegranate remains for a longer time).



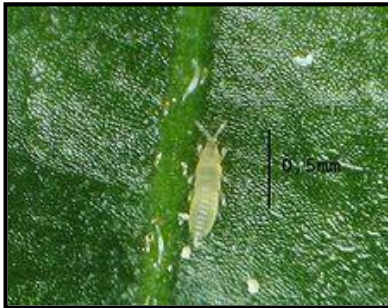
Adult

Thrips *Anaphothrips oligochaetus* (flower and fruit thrips) *Rhipiphorothrips cruentatus*
Leaf thrips *Scirtothrips dorsalis* Thripidae: Thysanoptera

Host
Pomegranate

Symptoms & Damage

- These are found through out country. *A. oligochaetus* infests flower stalks, sepals, petals and fruits with their rasping sucking type of feeding.



Microscopic view of Thrip



Adult Thrips



Thrips infestation on pomegranate

- As a result, flowers are shed and fruits show scab like rough surface.
- *R. cruentatus* and *S. dorsalis* lacerate the leaves and suck oozing out sap causing curling of leaves.

Management

At flower bud initiation, foliar spray with acetamiprid (0.5ml/l) or imidacloprid (0.5ml/l) is effective.

Physiological Disorder

The major physiological disorders in pomegranate are fruit cracking, sun scald and aril browning. Proper management of these physiological disorders is essential to get good quality yield.

Fruit cracking:

Fruit cracking is a major problem in pomegranate growing areas and about 30 -50% fruit cracking has been observed during maturity. It also varies with variety, season and climate.

In fruit cracking, xylem and phloem tissue lose their ability to divide and enlarge. In summer, after a long dry spell when water supply or irrigation is resumed and meristematic tissue quickly resumes growth but due to uneven growth rate fruit splitting occurs, while during winter fluctuating moisture and temperature causes cracking. Nutrients like boron, calcium, copper, zinc, molybdenum, manganese and potash are involved in different physiological activities during fruit growth and development. Deficiencies of nutrients along with imbalanced use of nutrients also cause cracking. In young orchard, fruit cracking is due to boron deficiency while in old orchard moisture imbalance and fluctuating temperature are major factors associated with fruit cracking. Fruits split generally when rains come or irrigation is given after a long dry spell.



Management

- Apply adequate and regular irrigation during fruiting season.
- Spray of gibberellic acid @ 20 ppm (2g/100 litre), calcium chloride 2.0 % (20g/litre) and boron 0.2% (2g/litre) at fruit enlargement and 1 month before harvest can help in reducing cracking.

Sun Scald

During summers, sun scald is also serious disorder in improper canopy managed orchard. Surface of fruits which are towards sun light turns brownish black due to intensive scorching heat during hot months particularly during July.

Management

- Proper training and pruning is required to avoid the direct exposure of fruits to sunlight.
- Shading with 35% shade net is helpful in reducing sunburn on pomegranate fruit.
- Bagging of fruits with cover bags is also useful in minimizing sun sunscald problem. White colour bags are more efficient in reflecting sunlight.

Aril browning

It is due to delayed harvesting in which arils become brown and start rotting.

Management

- The harvesting should not be delayed beyond maturity period.
- The pomegranate fruits should be harvested as soon as they mature viz., between 170- 180 days after blooming in Bhagwa.

Post-Harvest Management

Storage

Pomegranate fruit can be stored for 2-3 months successfully at a temperature of 5-7°C with 90-95% relative humidity. This temperature range needs to be kept throughout the transport and further storage. The temperature should never go below the 5°C, otherwise it will result in chilling injury.

Packing & transportation

The pomegranates fruits are packed in white or red colored CFB boxes having 3-5 plies for domestic markets. The cut pieces of waste of newspaper are used as cushioning material for the fruits. The fruits can be shipped through road transport by trucks/lorries from orchards to the market.

Notes

Notes

For more details contact:

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