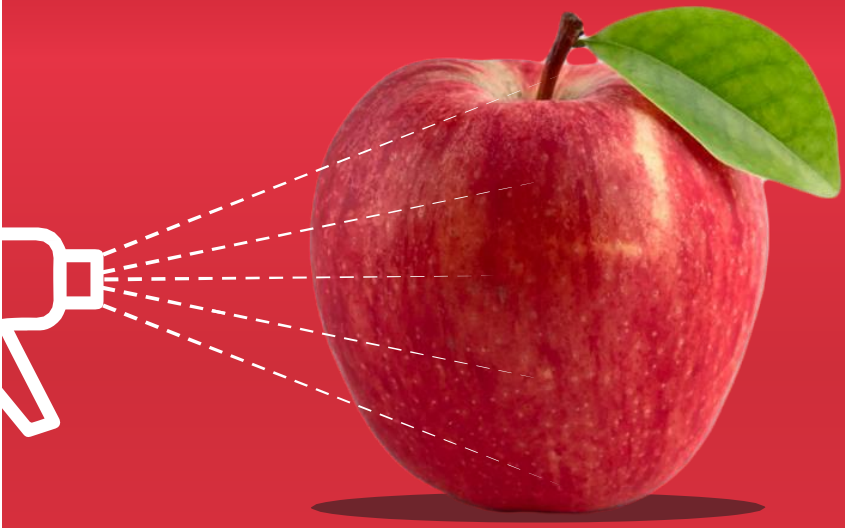

MANAGEMENT GUIDE FOR APPLE ORCHARDS IN KASHMIR

(2023)

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Management guide for Apple orchards under normal weather conditions* of Kashmir (2023)

Spray	Phenological stage	Cultural / Management practices	Insecticide/ Acaricide/ Oil per 100 litres of water	Fungicide per 100 litres of water
I	**Delayed dormancy**	• Ensure that proper training and pruning • Ensure orchard sanitation • Ensure proper drainage in orchards • Staking of fruit plants	Horticulture Mineral Oil (2 litres) *Do not spray HMO beyond green tip stage*	X
II	**Green tip**	• Apply recommended dose of well decomposed FYM and fertilizers (1/3rd dose of Urea, full dose of DAP and ½ dose of MOP) as per age of tree • Staking of new plants • Ensure proper drainage	X	Mancozeb 75 WP (300 g) **or** Captan 50 WP (300 g) **or** Propineb 70 WP (300g) **or** Zineb 75 WP (300 g) **or** Metiram 70 WG (300g)
III	**Pink bud**	• Foliar application of Boron (1-1.5g / litre) • Introduce 3-4 bee hives per hectare for effective pollination at 5-10 per cent bloom • Irrigate orchards if necessary • Mowing of orchard floor	***Need based for Insects:*** (a) If HMO spray is missed apply Dimethoate 30 EC (100 ml) (b) For Blossom Thrips: When 2 or more thrips per flower are observed spray Thiacloprid 21.7 SC (40 ml)	**10-14 days after II spray** Metiram 55% + Pyraclostrobin 5% 60 WG (100 g) **or** Zineb 68% + Hexaconazole 4% 72 WP (100 g) **or** Dodine 65 WP (60 g) **or** Dodine 40 SC (90 ml) **or** Tebuconazole (6.7%) + Captan (26.9%) 33.6 SC (250 ml)

***** For location specific decisions and under abnormal weather conditions, contact concerned Horticulture Development Officers/KVK scientists/Directorate of Extension / Scientists of Division of Pathology and Entomology, SKUAST-Kashmir for advice.

Spray	Phenological stage	Cultural / Management practices	Insecticide/ Acaricide/ Oils per 100 litres of water	Fungicide per 100 litres of water
IV	**Petal fall**	**Need Based** • Foliar application of Boron (1-1.5g/litre) /Zinc Sulphate (3-4 g/litre) to improve quality	***Need based for Insects:*** Dimethoate 30 EC (100 ml) **or** Quinalphos 25 EC (100 ml) **or** Neem oil (1500 ppm) @ 300 ml followed by *Lecanicillium lecanii* 1.0% WP ($1x10^8$CFU /gm) @ 500gm **or** *Metarhizium anisopliae 1.0% WP ($1x10^8$CFU /gm) @ 500gm after a gap of 4days For areas affected with apple blotc leaf miner: Installation of yellow sticky traps @ 1 trap 10 meters apart ***Need based for Mites:*** Apply acaricide when 4-5 mites per leaf are observed Hexythiazox 5.45 EC (40 ml) **or** Spiromesifen 22.9 SC (40 ml) **or** Fenazaquin 10 EC (40 ml) **or** Cyenopyrafen 30 SC (30ml)	**When 60-70 per cent petal fall occurs** Difenoconazole 25 EC (30 ml) **or** Flusilazole 40 EC (20 ml) **or** Trifloxystrobin 25% + Tebuconazole 50% 75 WG (40 g) **or** Fluopyram 17.7 % + Tebuconazole 17.7 % 400 SC (50 ml)
V	**Fruit let (Pea size)**	• Thinning of fruits in case of heavy fruit set either manually or by use of chemicals (NAA @ 5-10 ppm at 10-12 mm fruit size) • White washing of fruit tree trunks (1Kg Lime +300g Copper sulphate + 250g Glue in 10 liters of water) • Mulching of tree basins for weed/moisture management • Irrigate orchards as per requirement.	*For Insects:* Chlorpyriphos 20 C (100 ml) **or** Dimethoate 30 EC (100 ml) **or** Thiacloprid 21.7 SC (40ml) *Need based for Mites:* Apply acaricide when more than 5 mites per leaf are observed Hexythiazox 5.45 EC (40 ml) **or** Spiromesifen 22.9 SC (40 ml)	**10-14 days after IV spray** Zineb 68% + Hexaconazole 4% 72 WP(100 g) **or** Dodine 65 WP (60 g) **or** Dodine 40 SC (90 ml) **or** Fluxapyroxad 250g/l + Pyraclostrobin 250g/l 500 SC (20 ml) **or** Tebuconazole (6.7%) + Captan (26.9%) 33.6 SC (250 ml)

Spray	Phenological stage	Cultural / Management practices	Insecticide/ Acaricide/ Oils per 100 litres of water	Fungicide per 100 litres of water
VI	**Fruit Development-I**	• Application of second dose of fertilizers (1/3rd of Urea and remaining ½ dose of MOP) as per age of tree. • Foliar spray of calcium chloride(4 g/litre) • Irrigate orchards as per requirement • De-weeding and mowing in orchards.	***Need based for Insects:*** Chlorpyriphos 20 EC (100 ml) **or** Quinalphos 25 EC (100 ml) **or** Neem oil (1500 ppm) @ 300 ml followed by *Lecanicillium lecanii* 1.0% WP ($1x10^8$CFU /gm)@ 500gm ***Need based for Mites:*** When population is more than 10 mites per leaf apply Hexythiazox 5.45 EC (40 ml) **or** Spiromesifen 22.9 SC (40 ml)	**12-15 days after V spray** Mancozeb 75 WP (300 g) **or** Captan 50 WP (300 g) **or** Propineb 70 WP (300 g) **or** Zineb 75 WP (300 g) **or** Ziram 80 WP (200 g) **or** Metiram 70 WG (300g)
VII	**Fruit Development -II**	• Irrigate orchards as per requirement • De-weeding of orchards • Staking of heavy fruit laden branches	***For Insects:*** Dimethoate 30 EC (100 ml) **or** Chlorpyriphos 20 EC (100 ml) **or** Quinalphos 25EC (100ml) **or** Thiocloprid 21.7 SC (40ml) ***For Mites:*** Hexythiazox 5.45 EC (40 ml) **or** Fenazaquin 10EC(40ml) **or** Spiromesifen 22.9 SC (40 ml) **or** Summer spray Oil (750 ml)	**12-15 days after VI spray** Difenoconazole 25 EC (30 ml) **or** Flusilazole 40 EC (20 ml) **or** Trifloxystrobin 25% + Tebuconazole 50% 75 WG (40 g)**or** Fluxapyroxad 250g/l + Pyraclostrobin 250g/l 500 SC (20 ml)

Spray	Phenological stage	Cultural / Management practices	Insecticide/ Acaricide/ Oils per 100 litres of water	Fungicide per 100 litres of water
VIII	Fruit Development-III	• Apply remaining 1/3rd dose of Urea • Second spray of calcium chloride (4 g/litre) • Leaf tissue testing for next year fertilizer management **Need based:** • Ist Foliar spray of Potassium sulphate (4-5 g/litre) for colour development • De-weeding around the tree basin • Irrigate orchards as per requirement	***Need based for Insects:*** Chlorpyriphos 20 EC (100ml) **or** Dimethoate 30 EC (100 ml) **or** Quinalphos 25 EC (100ml) **or** Thiocloprid 21.7 SC (40ml) **or** Neem oil (1500 ppm) @ 300 ml followed by *Lecanicillium lecanii* 1.0% WP ($1x10^8$CFU /gm)@ 500gm **or** *Metarhizium anisopliae 1.0% WP ($1x10^8$CFU /gm)@ 500gm after a gap of 4days ***Need based for Mites:*** If population is > 10 mites/leaf Fenazaquin 10 EC (40 ml) **or** Spiromesifen 22.9 SC (40 ml) **or** Cyenopyrafen 30 SC (30ml)	**12-15 days after VII spray** Mancozeb 75 WP (300 g) **or** Zineb 75 WP (300 g) **or** Ziram 80 WP (200 g) **or** Ziram 27 SC (600 ml) **or** Chlorothalonil 75 WP (150 g)
IX	Fruit Development-IV	• De-weeding around the tree basin • Orchard sanitation including collection of fallen fruits • Irrigate orchards as per requirement • Harvesting of early maturing varieties	X	**12-18 days after VIII spray** **a)For Alternaria leaf blotch & Scab** Zineb 68% + Hexaconazole 4% 72 WP (100 g) **or** Hexaconazole 5 EC (50 ml) **or** Myclobutanill 10 WP (70 g) **or** Metiram 55% + Pyraclostrobin 5% 60 WG (100 g) **b)For Marssonina leaf blotch / Sooty blotch / Flyspeck** Mancozeb 75 WP (300 g) **or** Ziram 27 SC (600 ml) **or** Propineb 70 WP (300 g) **or** Ziram 80 WP (200 g) **or** Metiram 70WG (300g)

Spray	Phenological stage	Cultural / Management practices	Insecticide/ Acaricide/ Oils per 100 litres of water	Fungicide per 100 litres of water
X	**Pre-harvest**	*Need based sprays*: • Naphthalene acetic acid (10 ppm) for controlling pre harvest fruit drop • 2nd foliar spray of Potassium sulphate for colour development (4- 5 g/litre) • Third Spray Calcium chloride (4 g/ litre) for better storage life	X	**Need Based- Long Term Storage: (20-25 days before harvest)** Mancozeb 75 WP (300g) **or** Captan 50 WP (300g) **or** Ziram 80 WP (200g) **or** Zineb 75 WP (300g) **or** Metiram 70 WG (300g)
XI	**Harvesting**	**Follow maturity indices:** Starch index test (0-6.0 scale) • 2.5 for CA Storage • 3.5 for table purpose • Ease of separation of the fruit from spur • Skin Colour >75% Red (variety specific) • TSS : 12 to 14°Brix • Pressure: 16-18lb/square inch • Seed colour :Brown-blackish	X	X
XII	**Post- harvest**	• Orchard sanitation • Soil testing for nutrient management • Foliar application of Boron (1.0 g/lire) • Staking/ tying of branches to prevent snow damage • Tightening of trellis in HDP • Removal of shade/hail nets	***Need based for Insects:*** Chlorpyriphos 20 EC (100 ml) ***Need based for Mites*:** • If population is more than 20 mites/ leaf • Fenzaquin 10 EC (40 ml) **Essential Spray** • In areas where blotch leaf miner is a problem Quinalphos 25 EC (100 ml)	X

Spray	Phenological stage	Cultural / Management practices	Insecticide/ Acaricide/ Oils per 100 litres of water	Fungicide per 100 litres of water
XIII	**Dormancy**	**Canopy management:** • Training and pruning of orchards as per recommendations **Orchard sanitation** • Ensure orchard sanitation for effective disease and pest management.	**For areas affected with apple blotch leaf miner:** 1. Proper sanitation in the vicinity of orchards 2. Procurement of disease and pest free planting material from certified nurseries. 3. Collection of Fallen leaves/ fruits / other debris and their immediate destruction. 4. Scrapping of loose bark for exposing the pupa from tree trunks followed by its destruction. **For areas affected with apple fruit borer:** 1. Field sanitation 2. Collection and disposal of infested fruit 3. Trunk banding during October- November and killing of overwintering larvae during December	X

*Bio agent should not be sprayed in areas where sericulture is practiced by the farmers
**Give preference to Captan 50 WP in case rainy weather hampers green tip spray
**Spray 50 WP at least 10 days after oil spray.

Disclaimer: The molecules have been evaluated by SKUAST-K for bio-efficacy against apple diseases and pests, and the advisory/ information has been compiled for guidance and not for legal purposes.

Caution: For location specific decisions and under abnormal weather conditions, contact concerned Horticulture Development Officers/ KVK scientists/Directorate of Extension / Scientists of Division of Pathology and Entomology, SKUAST-Kashmir for advice.

Important instructions:

i. Avoid mixing of fungicides, insecticides and spray suspensions.
ii. Maintain gap of 3-4 days between insecticide and fungicide spray.
iii. Adjuvant /Stickers may be added for better efficacy of fungicides especially during rainy days. Stickers should not be used with Dodine.
iv. In case of heavy rains within 12 hours of spray, the spray is to be repeated immediately (when adjuvant /stickers are not used).
v. Before conducting the spray, inform the beekeepers in the vicinity of the orchard about spraying time; bee colonies should be kept preferably away from spraying area.
vi. Same pesticide should not be repeated in two consecutive sprays.
vii. Avoid spraying during high temperatures/rainy weather. All sprays should be conducted during early morning or evening hours to avoid phytotoxicity.
viii. No spray should be done during full bloom period.
ix. Spray of the insecticides/fungicides should be stopped 3-4 weeks before harvesting of fruit.
x. Keep 60 cm of soil around the tree trunks undisturbed.
xi. Close monitoring of pests and diseases is important for effective management.
xii. Apply fertilizers 1-2 feet away from tree trunk
xiii. In alkaline or acidic soils , phosphorous dose should not be increased by 20 per cent

Do's and Don'ts of Pesticide Application

A) Do's:

- Purchase pesticides only from registered dealer(s) having valid license.
- Check Batch No., Registration No., Manufacture /Expiry Date on the labels.
- Always purchase with proper bill or invoice.
- Storage place should be well protected from direct sunlight or rain.
- Read instructions on pesticide container label carefully before use.
- Always use clean water for making pesticide suspension as per requirement.
- Use protective clothing viz., hand gloves, face masks, aprons, etc. to cover whole body.
- Always protect your nose, eyes, ears, hands etc. from spill of spray suspension.
- Use recommended dose of pesticides.
- Select right kind of equipment for spraying.
- Spray pesticide during morning or evening hours.
- Agitate spray suspension continuously while spraying.

B) Don'ts:

- Don't use muddy or stagnant water for preparing pesticide suspension.
- Don't prepare or spray pesticides without wearing protective clothing.
- Avoid spilling of pesticide suspensions while filling or spraying.
- Don't use over or sub lethal dose of pesticide.
- Don't spray pesticides during full bloom period.
- Don't spray during day time when temperature is high.
- Don't mix various pesticides.
- Don't eat, drink, chew or smoke during spraying or preparing pesticide suspension.
- Don't transfer pesticide from original to other container.
- Don't use leaky or defective equipment.
- Don't blow / clean clogged nozzles with mouth.

Annexure-I
Pesticide Formulations Evaluated and Recommended (2023)

(A) Fungicide

S.No	Fungicides	Formulations	Name of the Company
1	Captan	Captaf (50 WP)	M/s Rallis India Ltd.
		Deltan (50 WP)	M/s Coromandel Agrico Pvt. Ltd.
		Kohicap (50 WP)	M/s FIL Industries Ltd.
		Captax (50 WP)	M/s India Pesticide Ltd.
		Merimain (50 WP)	M/s Adama India Pvt. Ltd
		Captra (50 WP)	M/s Indofil Industries Ltd.
		Kri-Captan (50 WP)	M/s Krishi Rasayan Exports Pvt. Ltd
		Panther (50 WP)	M/s HPM Chemicals & Fertilizers Ltd.
2	Chlorothalonil	Tata Ishaan (75 WP)	M/s Rallis India Ltd.
3	Difenoconazole	Score (25 EC)	M/s Syngenta India Ltd.
		Rubigan-D (25 EC)	M/s FIL Industries Ltd.
		Casper (25 EC)	M/s Godrej Agrovet Ltd.
		Karara (25 EC)	M/s Agro Life Science Corporation
		Wilcore (24% EC)	M/s Willowood Crop Sciences Pvt. Ltd
4	Dodine	Noor (65 WP)	M/s Indofil Industries Ltd.
		Dodino FIL (40 SC)	M/s FIL Industries Ltd.
		FIL Super Star (65 WP)	M/s FIL Industries Ltd.
5	Flusilazole	Cursor (40 EC)	M/s Dhanuka Agritech Ltd.
		Governor (40 EC)	M/s FIL Industries Ltd.
6.	Flupyram 17.7% +Tebuconazole 17.7%	Luna	M/s Bayer Crop Sciences Limited
7	Hexaconazole	Contaf (5 EC)	M/s Rallis India Ltd.
		Mainex (5 EC)	M/s Adama India Pvt. Ltd.
		Krizole (5 EC)	M/s Krishi Rasayan Exports Pvt. Ltd.
		Sitara (5 EC)	M/s Indofil Industries Ltd.
		Hexahit 5 EC	M/sHindustan Pulvarizing Mills
		Titan (5 EC)	M/s Sudarshan Chemical Ltd.
		Envil (5 EC)	M/s FIL Industries Ltd.
8	Mancozeb	Indofil M-45 (75 WP)	M/s Indofil Industries Ltd.
		Dithane M-45 (75 WP)	M/s Dow Agro Science Mumbai Ltd
		Hindustan M-45 (75 WP)	M/s Hindustan Pulverising Mills Ltd
		Macoban (75 WP)	M/s Adama India Pvt. Ltd.
		Luzem – 45 (75 WP)	M/s Cheminova India Ltd.
		Kohinoor M-45 (75 WP)	M/s FIL Industries Ltd.
		Mount (75 WP)	M/s Bharat Insecticides Ltd.
		Tata - M45	M/s Rallis India Limited

S.No	Fungicides	Formulations	Name of the Company
9	**Metiram70% WG**	Polyram	M/s BASF India Ltd.
10	**Metiram 55% + Pyraclostrobin 5%**	Cabrio Top (60 WG)	M/s BASF India Ltd.
		Clutch (60 WG)	M/s P.I Industries
11	**Myclobutanil**	Grapple (10 WP)	M/s FIL Industries Ltd.
		Boon (10 WP)	M/s Indofil Industries Ltd.
		Nagarjuna Index (10 WP)	M/s NACL Ind. Ltd.
		Systhane (10 WP)	M/s Dow Agro Science Mumbai Ltd.
		Myclomain (10 WP)	M/s Adama India Pvt. Ltd.
		Insyst (10 WP)	M/s Biostadt India Ltd.
		Revolve (10 WP)	M/s Bharat Insecticides Ltd.
12	**Propineb**	Antracol (70 WP)	M/s Bayer Crop Science Ltd.
		Proximan (70WP)	M/s Adama India Pvt. Ltd
		Scale (70 WP)	M/s Krishi Rasayan Exports Pvt. Ltd.
		Filprostar (70WP)	M/s FIL Industries Ltd.
		Sway (70 WP)	M/s Cheminova India Ltd.
		Jannat (70 WP)	M/s Jain Shree Rasayan Udoyog Ltd.
		Sanipeb (70WP)	M/s P.I Industries
13	**Trifloxystrobin 25% + Tebuconcazole 50%**	Nativo (75 WG)	M/s Bayer Crop Science Ltd.
14.	**Tebuconcazole 6.7% + Captan (26.9%)**	Shamir	M/s Adama India Pvt. Ltd.
15.	**Ziram**	Cuman-L (27 W/V)	M/s Syngenta India Ltd.
		Zed-78 (80 WP)	M/s FIL Industries Ltd.
		IPL Ziram -80 (80WP)	M/s India Pesticide Ltd.
		Zirex-L (27 SC)	M/s FIL Industries Ltd.
		IPL Ziram -27 (27 SC)	M/s India Pesticide Ltd.
16.	**Zineb**	Indofil Z-78 (75 WP)	M/s Indofil Industries Ltd.
		Neutec (75WP)	M/s UPL & Marketed by M/s Swal Corporation Ltd.
17.	**Zineb 68% + Hexaconazole4%**	Avtar (72WP)	M/s Indofil Industries Ltd.
18.	**Fluxapyroxad 250g/l + Pyraclostrobin 250g/l**	Merivon (500 SC)	M/s BASF India Limited

(B) Oils/Insecticides/Acaricides Evaluated and Recommended (2023)

A	Oils	Trade Name	Name of Company
1.	i. Horticulture Mineral Oils for Delayed Dormant Spray	MAK All season HMO	M/s Bharat Petroleum Corp India Ltd
		HP Tree Spray Oil	M/s Hindustan Petroleum Corp Ltd
		Arbofine Extra	M/s Total Oil India Ltd.
2.	ii. Horticulture Mineral Oils for Summer Spray	MAK All season HMO	M/s Bharat Petroleum Corp India Ltd
		HP Tree Spray Oil	M/s Hindustan Petroleum Corp Ltd
		Arbofine Extra	M/s Total Oil India Ltd.
B.	**Insecticides**	**Trade Name**	**Name of the Company**
1.	Chlorpyriphos	Coroban (20 EC)	M/s Coromandel Agrico Pvt. Ltd.
		Kohiban (20 EC)	M/s FIL Industries Ltd.
		Dursban (20 EC)	M/s Dow Agro Science Mumbai Ltd.
		Tafaban (20 EC)	M/s Rallis India Ltd.
2.	Dimethoate	Rogor (30 EC)	Manufactured by Lupin & Marketed by M/S Cheminova India Ltd
		Tafgor (30 EC)	M/s Rallis India Ltd.
3.	Quinalphos	Ekalux (25 EC)	M/s Syngenta India Ltd.
4.	Thiocloprid	Alanto 240 SC (21.7%)	M/s Bayer Crop Science Ltd.
C	**Acricides**	**Formulations**	**Company**
1.	Fenazaquin	Majestic (10 EC)	M/s FIL Industries Ltd.
2.	Hexythiazox	Maiden (5.45 EC)	M/s Biostadt India Ltd
3.	Spiromesifen	Oberon 240 SC (22.9%)	M/s Bayer Crop Science India Ltd.
4.	Cyenopyrafen	NC-512 30 SC (Kunoichi)	M/s Insecticides India Ltd.

WP: *Wettable Powder*; **EC**: *Emulsifiable Concentrate*; **SC**: *Solution Concentrate*; **SL**: *Sprayable Liquid*; **WG**: *Water Dispersible Granules*.

Disclaimer:

- Use and sale of the products recommended in the schedule are subject to production of registration and label claim from CIB & RC, Govt. of India to be ascertained by Plant Protection officer / Directorate of Law Enforcement Department of Jammu & Kashmir.

DIFFERENT PHENOLOGICAL STAGES

DELAYED DORMANCY

GREEN TIP

PINK BUD

PETAL FALL

FRUIT LET (PEA SIZE)

FRUIT DEVELOPMENT -I

FRUIT DEVELOPMENT-II

FRUIT DEVELOPMENT-IV

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