



Plant Protection Schedule -2018

SKUAST
KASHMIR



**Plant Protection Schedule for the Management of
Insect Pest and Diseases of Apple (2018)**

Spray	Tree stage	Insecticide/Acaricide/Oils per 100 lit. of water	Fungicide per 100 lit. of water
I	Delayed Dormancy¹	Horticulture Mineral Oil (2 lit.)	x
II	Green Tip	x	Mancozeb 75 WP (300 g) or Propineb 70 WP (300 g) or Zineb 75 WP (300 g) or Captan 50 WP (300 g) ²
III	Pink bud	Need based: (a) If HMO spray is missed Dimethoate 30 EC (100 ml) (b) For Blossom Thrips Apply when 2 or more thrips per flower are observed Thiocloprid 21.7 SC (40 ml)	10-14 days after II spray Mancozeb 75 WP (300 g) or Propineb 70 WP (300 g) or Captan 50 WP (300 g) or Ziram 80 WP (200 g) or Dodine 65 WP (60 g) ³ or Carbendazim 12% + Mancozeb 63% 75WP (250 g) ³ or Captan 70% + Hexaconazole 5% 75 WP (50 g) ³
IV	Petal fall	Need based for SJS: Apply insecticides when 6-12 crawlers/cm ² of SJS are observed Dimethoate 30 EC (100 ml) or Quinalphos 25 EC (100 ml) Need based for ERM: Apply acaricide when 4-5 mites per leaf are observed Hexythiazox 5.45 EC (40ml) or Fenazaquin 10 EC (40 ml) or Spiromesifen 22.9 SC (40 ml)	When 60-70 % petal fall occurs Difenaconazole 25EC (30 ml) or Flusilazole 40 EC (20 ml) or Trifloxystrobin 25% + Tebuconazole 50% 75 WG (40 g)

V	Fruit let (Pea size)	Chlorpyrifos 20 EC (100 ml) or Dimethoate 30 EC (100 ml) or Thiocloprid 21.7 SC (40ml) <u>Need based for ERM:</u> Apply acaricide when more than 5 mites per leaf are observed Hexythiazox 5.45 EC (40 ml) or Spiromesifen 22.9 SC (40 ml) or Fenpyroximate 5 SC (100 ml)	<u>10-14 days after IV spray</u> Mancozeb 75 WP (300 g) or Propineb 70 WP (300 g) or Zineb 75 WP (300 g) or Captan 50 WP (300 g) or Ziram 80 WP (200 g) or Captan 70% + Hexaconazole 5% 75 WP (50 g)
VI	Fruit Development-I	<u>Need based:</u> When Bark and June beetles are observed in the field or trapped under light Chlorpyrifos 20 EC (100 ml) or Quinalphos 25 EC (100 ml) <u>Need based for ERM:</u> When ERM population is more than 10 mites per leaf Propargite 57 EC (100 ml) or Fenpyroximate 5 SC (100 ml)	<u>12-15 days after V spray</u> Dodine 65 WP (60 g) or Metiram 55% + Pyraclostrobin 5% 60 WG (100 g) or Kresoxim-methyl 44.3 SC (40 ml) or Zineb 68% + Hexaconazole 4% 72 WP (75g)
VII	Fruit Development -II	Dimethoate 30 EC (100 ml) or Thiocloprid 21.7 SC (40 ml) <u>(For ERM)</u> Hexythiazox 5.45 EC (40 ml) or Fenazaquin 10 EC (40 ml) or Spiromesifen 22.9 SC (40 ml) or Summer spray oil (750 ml)	<u>12-15 days after VI spray</u> Flusilazole 40 EC (20 ml) or Captan 70% + Hexaconazole 5% 75 WP (50 g) or Myclobutanil 10WP (50 g)
VIII	Fruit Development-III	<u>Need Based:</u> If more than 13 crawlers/cm² of SJS or colonies of WAA on terminal shoots are observed Dimethoate 30 EC (100 ml) or Chlorpyrophos 20 EC (100ml) <u>Need based for ERM:</u> If population is more than 15 mites per leaf Propargite 57 EC (100 ml) or Fenazaquin 10 EC (40 ml)	<u>12-15 days after VII spray</u> Mancozeb 75 WP (300 g) or Ziram 27 SC (600 ml) or Zineb 75 WP (300 g) or Ziram 80 WP (200 g) or Chlorothalonil 75 WP (150 g) <u>In case rainy weather hampers VII spray</u> Difenaconazole 25 EC (30 ml) or Trifloxystrobin 25% + Tebuconazole 50% 75 WG (40 g) or Zineb 68% + Hexaconazole 4% 72 WP (75g)

IX	Fruit Development-IV	x	<p>Need based: (a) when leaf spotting incidence is more than 20% 12-18 days after VIII spray Metiram 55% + Pyraclostrobin 5% 60 WG (100 g) or Captan 70% + Hexaconazole 5% 75 WP (50 g) or</p> <p>Hexaconazole 5 EC (50 ml) or Myclobutanil 10 WP (50 g)</p> <p>Need based: (b) For Marssonina / Sooty blotch / Flyspeck Mancozeb 75WP (300 g) or Ziram 27 SC (600 ml) or Propineb 70 WP (300 g) or Ziram 80 WP (200 g)</p>
X	Pre-harvest	x	<p>Need based: For long term storage 25 days before harvest Mancozeb 75 WP (300 g) or Zineb 75 WP (300 g) or Ziram 80 WP (200 g) or Captan 50 WP (300g)</p>
XI	Post- harvest	<p>Need based: If more than 13 crawlers/cm² of SJS or colonies of WAA on terminal shoots are observed Dimethoate 30 EC (100 ml) or Ethion 50 EC (100 ml)</p> <p>Need based for ERM: If population is more than 20 mites per leaf Propargite 57 EC (100 ml) or Fenazaquin 10 EC (40 ml)</p>	x

SJS- San Jose scale; ERM - European Red Mite; WAA -Woolly Apple Aphid

1. Delayed Dormancy spray should not go beyond green tip stage.
2. Spray Captan at least 10 days after Oil Spray
3. Give preference in case rainy weather hampers green tip spray

Note:

- a) Use and sale of the products recommended in the schedule are subject to production of registration and label claim from CIB & RC, GoI.
- b) The molecules have been evaluated by SKUAST-K for bio-efficacy against apple insect pest and diseases, and the advisory/ information has been compiled for guidance.

Caution:

- This schedule is devised for Kashmir Valley for normal weather conditions.
- For location specific decisions and under abnormal weather conditions, contact concerned Horticulture Development Officers/KVK scientists/Directorate of Extension, SKUAST-Kashmir for advice.
- For effective disease and pest management, ensure orchard sanitation through collection and destruction of fallen leaves, pruned/diseased/infected twigs and fallen/mummified fruits.

Important instructions

- i. Maintain a gap of 3-4 days between insecticide and fungicide spray.
- ii. Chemicals in the recommendations at a given stage are shown in order of their efficacy/increasing cost.
- iii. Adjuvants/Stickers may be added for better efficacy of fungicides especially during rainy days. Sticker like Sandovit @ 50-75 ml/100 lit. of suspension should be used.
- iv. Stickers should not be used with Dodine.
- v. Keep 60 cm of soil around trunks undisturbed.
- vi. All insecticides/fungicides sprays should be stopped 3-4 weeks before harvesting of fruit.
- vii. Same pesticide should not be repeated continuously in two sprays.
- viii. Use balanced nutrition (N:P:K+FYM as per Package of Practices recommended by SKUAST-K).
- ix. Under drought like conditions, 2-3 sprays of calcium chloride (dehydrated) @ 0.3-0.5% (3-5 g/lit.) after pea size stage along with 0.15% boric acid (1.5 g/lit.) at an interval of 10-15 days may be conducted after the first fungicide spray (Mid April to end April).
- x. After fruit-let stage, ensure periodical destruction of weeds beyond 60 cm around tree trunks.
- xi. Ensure removal of borer infested twigs/branches and their proper destruction.
- xii. Close monitoring of pests and diseases is important for effective management.
- xiii. In case of heavy rains (within 12 hours of spray) the spray is to be repeated immediately. (when adjuvants/stickers are not used).
- xiv. Before conducting the spray inform the beekeepers in the vicinity of the orchard about spraying time.
- xv. Bee colonies should be kept preferably away from spraying area.

Dos and Don'ts of Pesticide Application

A) Dos:

- Purchase pesticides only from registered dealer 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 solution as per requirement.
- Use protective clothing viz., hand gloves, face masks, apron, etc. to cover whole body.

- Always protect your nose, eyes, ears, hands etc. from spill of spray solution.
- Use recommended dose of pesticides.
- Select right kind of equipment for spraying
- Spray pesticide during morning or evening hours.
- Agitate spray solution continuously while spraying.

B) Don'ts:

- Don't use muddy or stagnant water for preparing pesticide solution.
- Don't prepare or spray pesticides without wearing protective clothing.
- Avoid spilling of pesticide solution 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 other than those recommended by SKUAST-K.
- Don't eat, drink, chew or smoke during spraying or preparing pesticide solution.
- Don't transfer pesticide from original to other container.
- Don't use leaky or defective equipments.
- Don't blow / clean clogged nozzles with mouth.

Pesticide Formulations Evaluated and Recommended for Spray Schedule for Apple (2018)

(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.
		Jaicap (50 WP)	M/S Jai Chemicals Ltd.
		Captan (50 WP)	M/S Jai Chemicals Ltd.
		Captax (50 WP)	M/S India Pesticide Ltd.
		Panther (50 WP)	M/S HPM Chemicals & Fertilizers Ltd.
		Merimain (50 WP)	M/S Adama India Pvt. Ltd.
		Captra (50 WP)	M/S Indofil Industries Ltd.
		Kri-Captan (50WP)	M/S Krishi Rasayan Exports Pvt. Ltd.
2.	Captan 70% + Hexaconazole 5%	Wave (75 WP)	M/S FIL Industries Ltd.
		Boxer (75 WP)	M/S Anu Products Ltd.
		Rely (75 WP)	M/S Cheminova India Ltd.
		Horse Power (75 WP)	M/S Bonageri Crop Science Ltd.
		Takatwar (75 WP)	M/S India Pesticides Ltd.
3.	Carbendazim 12% + Mancozeb 63%	Saathi (75 WP)	M/S FIL Industries Ltd.
		Covert (75WP)	M/S Cheminova India Ltd.
		Turf (75WP)	M/S Swal Corporation Ltd.
4.	Chlorothalonil	Tata Ishaan (75 WP)	M/S Rallis India Ltd.
5.	Difenaconazole	Score (25 EC)	M/S Syngenta India Ltd.
		Rubigan-D (25 EC)	M/S FIL Industries Ltd.
		Karara (25 EC)	M/S Agro Life Science Corporation
6.	Dodine	Super Star (65 WP)	M/S FIL Industries Ltd.
		Noor (65 WP)	M/S Indofil Industries Ltd.
7.	Flusilazole	Governor (40 EC)	M/S FIL Industries Ltd.
		Cursor (40 EC)	M/S Dhanuka Agritech Ltd.
8.	Hexaconazole	Contaf (5 EC)	M/S Tata Rallis India Ltd.
		Anvil (5 EC)	M/S Syngenta India Ltd.
		Control (5 EC)	M/S Maghmani Industries, Chandigarh
		Titan (5 EC)	M/S Sudarshan Chemical Ltd.
		Envil (5 EC)	M/S FIL Industries Ltd.
		Mainex (5EC)	M/S Adama India Pvt. Ltd.
		Krizole (5EC)	M/S Krishi Rasayan Exports Pvt. Ltd.
Sitara (5EC)	M/S Indofil Industries Ltd.		
9.	Kresoxim methyl	Ergon (44.3 SC)	M/S Rallis India Ltd.

10.	Mancozeb	Indofil M-45 (75 WP)	M/S Indofil Industries Ltd.
		Kohinoor M-45 (75 WP)	M/S FIL Industries Ltd.
		Jai M-45 (75 WP)	M/S Jai Chemicals Ltd.
		Dithane M-45 (75 WP)	M/S Dow Agro Science Mumbai
		Manfil (75 WG)	M/S Indofil Industries Ltd.
		Hindustan M-45 (75 WP)	M/S Hindustan Pulverising Mills Ltd.
		Macoban (75 WP)	M/S Adama India Pvt. Ltd.
		Mount (75 WP)	M/S Bharat Insecticides Ltd.
		Luzem-45 (75 WP)	M/S Cheminova India Ltd.
11.	Metiram 55% + Pyraclostrobin 5%	Cabrio Top (60 WG)	M/S BASF India Ltd.
		Chemtop (60 WG)	M/S Cheminova India Ltd.
12.	Myclobutanil	Grapple (10 WP)	M/S FIL Industries Ltd.
		Boon (10 WP)	M/S Indofil Industries Ltd.
		Index (10 WP)	M/S Nagarjuna Agri- Chemicals Ltd.
		Systhane (10 WP)	M/S Dow Agro Science Mumbai Ltd.
		Myclomain (10 WP)	M/S Adama India Pvt. Ltd.
		Bonas (10 WP)	M/S Godrej Agrovet Ltd.
		Insyst (10 WP)	M/S Biostadt India Ltd.
		Limpid (10 WP)	M/S Cheminova India Ltd.
		Revolve (10 WP)	M/S Bharat Insecticides Ltd.
13.	Propineb	Antracol (70 WP)	M/S Bayer Crop Science Ltd.
		Proximain (70 WP)	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.
		Janat (70 WP)	M/S Jai Shree Rasayan Udyog Ltd.
14.	Trifloxystrobin 25% +Tebuconazole 50%	Nativo (75 WG)	M/S Bayer Crop Science Ltd.
15.	Ziram	Cuman-L (27 W/V)	M/S Syngenta India Ltd.
		Zed-78 (80 WP)	M/S FIL Industries Ltd.
		Zirex-L (27 SC)	M/S FIL Industries Ltd.
16.	Zineb	Indofil Z-78 (75 WP)	M/S Indofil Industries Ltd.
		Neutec (75 WP)	M/S Swal Corporation Ltd.
17.	Zineb 68% + Hexaconazole 4%	Avtar (72WP)	M/S Indofil Industries Ltd.



(B) Insecticides

S.No	Oils	Formulations	Name of the Company
1	Horticulture Mineral Oils for Delayed Dormant Spray	Orchol -13	M/S R.G. Industries
		Orchol -TSO	M/S R.G. Industries
		Arbofine Extra	M/S Total oil India Ltd
		HP Tree Spray Oil	M/S Hindustan Petroleum Corp. India Ltd
		MAK All Season HMO	M/S Bharat Petroleum Corp. India Ltd.
		Servo	M/S Indian Oil Corporation Ltd.
		Petro star	M/S Petro Star Ltd.
		HMO	M/S Indian Oil Corporation Ltd.
		ATSO spray oil	M/S Krishna Antioxidants Pvt. Ltd.
	Duratek	M/S Raj Petro Specialist	
	Horticulture Mineral Oils for Summer Spray	Arbofine Extra	M/S Total oil India Ltd.
		HP HMO	M/S Hindustan Petroleum Corp. Ltd
		Orchol-13	M/S R.G. Industries
		MAK All Season HMO	M/S Bharat Petroleum Corp. India Ltd.
		Servo	M/S Indian Oil Corporation Ltd.
		Petro star	M/S Petro Star Ltd.
		HMO	M/S Indian Oil Corporation Ltd.
		ATSO spray oil	M/S Krishna Antioxidants Pvt. Ltd.
Duratek	M/S Raj Petro Specialist		
2. Insecticides			
	Chlorpyrifos	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.
	Dimethoate	Rogor (30 EC)	M/S Cheminova India Ltd.
		Tafgor (30EC)	M/S Rallis India Ltd.
	Quinalphos	Ekalux (25 EC)	M/S Syngenta India Ltd.
	Thiocloprid	Alanto 240 SC (21.7%)	M/S Bayer Crop Science Ltd.
	Ethion	Tope (50 EC)	M/S FIL Industries Ltd.
		Lazor (50 EC)	M/S Cheminova India Ltd.
		Tafethion (50 EC)	M/S Rallis India Ltd.
3. Acaricides			
	Fenazaquin	Magister (10 EC)	M/S Denocil Crop Protection Ltd.
		Majestic (10 EC)	M/S FIL Industries Ltd.
	Fenpyroximate	Sedna (5 SC)	M/S Rallis India Ltd.
	Hexythiazox	Maiden (5 EC)	M/S Biostadt India Ltd.
		Karadite (5 SC)	M/S Godrej Agrovet
	Propargite	Omite (57 EC)	M/S Crompton Specialists Asia Pacific Pvt. Ltd.
	Spiromesifen	Oberon 240 SC (22.9%)	M/S Bayer Crop Science India Ltd.

WP: Wettable Powder, EC: Emulsifiable Concentrate, SC: Suspension Concentrate,
SL: Sprayable Liquid, WG; Water Dispersible Granules

