

Table (1) : Trade name , rate/100 L ,active ingredient of fungicides and mode of their actions .

Fungicides commercial Name	Dose	Mode Of Action	Active ingredient
Sulfur 80%	250g	All fungal species were highly sensitive to S0 . Spore germination (Richard and Jane ,2004)	Sulfur(contact) (original source Farm)
Copper sulfate 85%	200g	Effect on faction of protein and enzymes that due to damage cell wall membrane	Copper sulfate (contact) (original source Farm)
Copper Oxichloride 875 WP	200g	(Mirkovic <i>et al.</i> 2015).after which toxic copper ions are taken up by the germinating fungal spores.ANJAL, <i>et.al.</i> (2021).	78%copper (contact) (original source Farm)
Champion 77% Wp	180g		77%copper hydroxide(protective) (original source Farm)
Vevando 50%Sc	20cm	It affected all stages of fungal growth and development. NAVE, <i>et.,al.</i> .(2002)	Metrafenone (contact) (original source Farm)
Flint 50% WG	20 g	trifloxystrobn resulted in increased plant growthand leaf chlorophyl content. (Song Hee Han, <i>et.al.</i> ,2012). Both pyraclostrobin and trifloxystrobin were highly active causing complete inhibition of spore germination.	50% Trifloxystrobin(protective) (original source Orma Company)
Topas 10%	10 cm	It belongs to the class of sterol demethylation inhibitors (DMI inhibitors), which inhibits the biosynthesis of cell membrane ergosterol. It is a systemic triazole fungicide with protective and curative action.(The first draft was prepared by Professor Mi-Gyung Lee, Andong National University, Republic of Korea)	Penconazole (protective, systemic and curative) (original source Farm)
Telio Z 25 %Ec	15cm/	Propiconazole 3.6 EC Fungicide is in the Group 3 class fungicides. The mode of action of Propiconazole 3.6 EC Fungicide is as a demethylation inhibitor of sterol biosynthesis (DMI) which disrupts membrane synthesis by blocking demethylation. Fungal pathogens can develop resistance to products with the same mode of action when used repeatedly. Because resistance development cannot be predicted.(Published by United States Environmental Protection Agency Washington, DC 20460)	Propiconazol (systemic) (original source Farm)
Delta Dom 25% Ec	50 cm	Many researchers believe that the main reason for the decrease in the effectiveness of preparations that inhibit ergosterol synthesis is repeated s, which led to a decrease in the sensitivity of the phytopathogen .(Lyudmila Grischechkina, <i>et., al.</i> , 2021)	Difinoconazole(systemic) (original source Orma Company)
Score25%EC	50 cm		Difinoconazole(systemic) (original source Orma Company)
Prodizole 30%Ec	50 cm		Difenconazol15%+Propiconazol%(systemic)(original source Farm)
Top Line32.5 %Sc	75 cm	The mode of action of the strobilurins against fungi is their ability of inhibit mitochondrial respiration by binding thesocalled Qo site of cytochrome b. located in cytochrome bc1complex and that part of the inner of mitochondrial membrane of fungi. This inhibition blocks the electrons transfer between cytochrome b and cyto-chrome c1 that causes disruption of the fungus energy cycle, within halting the production of ATP (Bartlett <i>et al.</i> , 2002).	Azoxystrobin 20%Difenconazol 12.5% (systemic) (original source Orma Company)
Amistar top 32.5%SC	75cm		Azoxystrobin(systemic Difinoconazole(systemic) (original source Orma Company)
Amisto 25%Sc	50cm		Azoxystrobin(systemic) (original source Farm)
Trolls 25%EW	50 cm	The active ingredient in tebuconazole 3.6 Ag Fungicide is a member of the DMI (Demethylation Inhibitor) fungicide group and FRAC grouping 3. Its mode of action inhibits synthesis of sterols. The triazole fungicide's actions are protective, curative (when applied early in the fungal pathogen's life cycle) and systemic in nature. The active ingredient is absorbed by root and leaf tissue, and then moves to the growing tissue. (Chlorothalonil is a Substituted Benzene fungicide that slows sporulation and growth rates of fungi and a member of FRAC group Y, Multi Site Action. Its action is protective and makes it a good resistance management partner).	Tebuconazole(systemic) (original source Orma Company)
Systhane 24%Ec	22cm	Myclobutanil appears to be a specific inhibitor of sterol 14-demethylase, which disrupts the <u>ergosterol</u> biosynthesis pathway which is vital to fungal cell wall formation. It is classified as a demethylation inhibitor (DMI) fungicide .	Myclobutanil(systemic) (original source Orma Company)
Bellis 38% Wp	50g	a new fungicide having protective and curative action. It inhibits spore germination, germ tube elongation, mycelial growth and sporulation. FILAN FUNGICIDE acts systemically. For resistance management boscalid is a member of the oxathiin group of fungicides. It is a Group G Fungicide.	Boscalid25.2%+pyraclostrobin 12.8%(systemic) (original source Farm)
Cantus 50% Wg	100g		Boscalid(systemic) (original source Orma Company)
Collise30%Sc	50 cm		Boscalid20%+kresoximethyl10%(systemic) (original source Orma Company)
Hesta 70%Wp	65g	Kresoxim-methyl It is a broad spectrum Strobilurin fungicide with a protective, curative and eradivative mode of action. In addition to the spectrum of control it gives good residual activity and hence extended duration of control. It acts by inhibiting spore germination, redistribution via vapour phase contributes to activity. Kresoxim Methyl is very effective against powdery mildew for most of the crops and has good greening effect.	thiophenate methyl(systemic) (original source Farm)
Domark 10%EC	40cm	Most effective disease control is obtained by preventative spray timing as climatic conditions indicate fungal infection or growth is imminent.	tetraconazole(systemic) (original source Farm)
Vectra10%Sc	40 cm	Tetraconazole inhibits the metabolic pathway of fungal ergosterol production This causes the cell membranes to malfunction, leading to the death of the fungus.	Bromuconazol(systemic) (original source Farm)
Romel 75% Wp	200g	Bromuconazole is a member of the class of oxolanes carrying 1,2,4-triazol-ylmethyl and 2,4-dichlorophenyl substituents at position 2 as well as a <u>bromo</u> substituent at position 4. A foliar applied conazole fungicide for a range of crops including cereals, fruit, vegetables and vines. It has a role as an EC 1.14.13.70 (sterol 14alpha-demethylase) inhibitor and an antifungal agrochemical. It is a dichlorobenzene, an organobromine compound, a member of oxolanes, a member of triazoles, a conazole fungicide and a triazole fungicide.	Mancozeb+ Metalaxyl(systemic) (original source Orma Company)
		Mancozeb is a dithiocarbamate fungicide with effects on the nervous system via its main metabolite, carbon disulfide. Mancozeb - Fungicide with protective action. Non-specific thiol reactant. Inhibits respiration. Metalaxyl - Systemic fungicide with protective and curative action. Absorbed through the leaves, stem and shoot. Inhibits protein synthesis in fungi by interfering with the synthesis of ribosomal RNA.	

Table (2): Fertilizers treatments names, rate, and their mode of action

TREATMENTS	Rate	Mode of action
Micronics sulfur (original source Farm)	250 g/100L	Sulfur is a component of amino acids, proteins, and enzymes. It is also essential for the synthesis of chlorophyll.
Chitosan (original source Farm)	0.5 g / litter	conveyed by the positively charged NH_3^+ groups of glucosamine, might be a fundamental factor contributing to its interaction with the negatively charged microbial cell surface, ultimately resulting in impairment of vital bacterial activities
Calcium Phosphate (original source ,El Gomhoria Com.)	1.5gm/ L	It reacts with acid in the stomach to raise the pH 3. In toothpaste it provides a source of calcium and phosphate ions to support remineralization of the teeth 1. As a supplement it provides a source of calcium and phosphate, both of which are important ions in bone homeostasis.Also, Calcium (Ca) Function : – Aids in the movement of carbohydrates in plants – Essential to healthy cell walls & root structure
Potassium monophosphate (original source ,El Gomhoria Com.)	1 gm./L	Monopotassium phosphate, MKP, (also potassium dihydrogenphosphate, KDP, or monobasic potassium phosphate), KH_2PO_4 , is a soluble salt of potassium and the dihydrogen phosphate ion. It is a source of phosphorus and potassium as well as a buffering agent. It can be used in fertilizer mixtures to reduce escape of ammonia by keeping pH low.
Potassium di phosphate (original source ,El Gomhoria Com.)	1gm/L	Potassium dihydrogen phosphate is a <u>potassium</u> salt in which <u>dihydrogen phosphate</u> (1-) is the counterion. It has a role as a fertilizer. It is a <u>potassium</u> salt and an inorganic phosphate. The active ingredient, potassium dihydrogen phosphate (also referred to as monopotassium phosphate) is a synthesized active ingredient (a.i.). The end-use product is a crystalline powder containing 100% active ingredient. The chemical abstract service (CAS) number for monopotassium phosphate (KH_2PO_4).Also, Potassium (K) Function : – Improves plant ability to resist disease & Cold. – Aids in the production of carbohydrates.
Potassium phosphate (original source Farm) GROUP 33 FUNGICIDE, (Protection), and systemic	1 ml	Creates an immune response within the host plant and also has direct antifungal activity. (MKP) and (DKP), successively. Spore germination and germ tube elongation inhibition ranged from 0 to 100% for both compounds; in addition, DKP at 2% inhibited mycelial growth completely. Also, Phosphorus (P) Function : – Stimulates early growth and root formation. – Hastens maturity. – Promotes seed production. – Makes plants hardy.
Micro elements (original source Farm)	0.1 gm/L	<u>Copper</u> is involved in nitrogen and carbohydrates metabolism. It is a component of several enzymes, including enzymes that take part in photosynthesis and respiration. <u>Iron</u> is Involved in plays an important role in chlorophyll formation. It is involved in cell division that supports plant growth, and in other vital reactions in the plant. <u>Manganese</u> (Mn) is required for photosynthesis and respiration. It improves green color and increases sugar and protein content. Manganese enhances plant tolerance to high light intensity. <u>Boron</u> is necessary for cell wall formation, membrane integrity and calcium uptake. It assists in the translocation of sugars and affects numerous functions in plants, including flowering, pollen germination, fruiting, cell division, water relationships and the transport of hormones. <u>Zinc</u> is a component or functional cofactor in many enzymes, including auxins (plant growth hormones). It is essential for carbohydrate metabolism, protein synthesis and internodal elongation (stem growth).Molybdenum is involved in many enzymes and is closely linked with nitrogen metabolism as it is an important component of nitrate-reductase and nitrogenase enzymes.

Table (3): Stage of application, and Date of recorded data of three chemical control programs (CP), as well as, Farm chemical program (Fcp), mango modified chemical 1 program(MPc1 .

Stage	<u>Date of application</u>	<u>chemical control Proposed programs (PCP)</u>	mango modified chemical 1 program(MPc1 .	<u>Farmchemical program (Fcp)</u>
Started, (bud break)	1/1: 11/Jan	Tops	Micronics Sulpher	Micronics Sulpher
Budding, (Budburst) to leave development and Shoot Growth	11/22jan	Micronics Sulpher	Champion	Copper Oxichloride87% WP
	22/Jan / 2/Feb.	Champion	Vevando 50%Sc	Micronics Sulpher
	3/Feb : 13/Feb	Score25%EC	Hesta	Copper sulphate85%
from budding to flowering (Flower Cluster Initiation)	13/Feb : 24/Feb	Copper sulfate 85%	Vectra10%Sc	Topas
	24/Feb: 6/ Mar.	Cantus	Delta Dom	Topas
	7/Mar. : 17/Mar	Telio Z 25 %Ec	Top Line32.5 %Sc	Prodizole
	18/Mar: 28/Mar.	Mycobytil	Systhane	Prodizole
Flower and fruiting set to the growth of clusters	29/Mar.:8/Apr.	Collise30%Sc	Bellise	Bellise
	9/Apr.: 19/Apr.	Amistar- Top	Amisto	Bellise
From the beginning (Fruit Set) Up to Berry Growth (of ripening to full ripening).	20/Apr.: 30/Apr.	Romel	Trolls 25%EW	Domark 10%EC
from (full ripening to Harvest) (Berry Growth Up to Harvest)	1/May: 11/May	Hesta	Filent	Topsen M70%
Stop until harvest				

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Table (5): Effect of three Proposed chemical control programs (PCP), as well as, Farm chemical program (Fcp), mango modified chemical 1 program(MPc1) on diseases severity of Powdery mildew , and also. disease incidence % some foliar three grape varieties (Film ,Superior and Thomson) diseases(Di- back ,leave spotsm follower blight and fruit rot),under Noubria region condition , season(2022).

Stage And diseases	Proposed chemical control programs (CP)			mango modified chemical 1 program(MPc1			Farm chemical program (Fcp			chemical control programs (CP)			mango modified chemical 1 program(MPc1			Farm chemical program (Fcp		
	Disease incidence %2022 Associated Diseases									Disease Severity of Powdery Mildew % 2022								
	Film	Supair	Thomson	Film	Supair	Thomson	Film	Supair	Thomson	Film	Supair	Thomson	Film	Supair	Thomson	Film	Supair	Thomson
Diseases	Di- back									Di- back								
Started bud break (0.0 Time)	3	4	6	4	7	9	5	11	14	00	00	00	00	00	00	00	00	00
General Control	9	11	18	9	11	18	9	11	18	00	00	00	00	00	00	00	00	00
Diseases	Levees spots									Levees spots								
Budding (Budburst) to leave development and Shoot Growth	12	19	16	9	14	20	16	22	29	13	8	11	14	10	15	18	17	20
General Control	23	25	30	25	30	35	23	25	30	27	31	36	27	31	36	27	31	36
Diseases	Twig blight									Twig blight								
from budding to flowering (Flower Cluster Initiation)	4	8	11	7	10	17	9	14	19	5	8	11	10	13	22	16	20	28
General Control	18	27	33	23	30	35	18	27	33	36	40	48	36	40	48	36	40	48
Diseases	Flower blight									Flower blight								
Flower and fruiting set to the growth of clusters	3	5	9	5	8	12	8	10	15	5	8	12	9	11	17	11	18	21
General Control	24	31	36	24	31	36	24	31	36	39	45	50	39	45	50	39	45	50
Diseases	Fruit set Blight and unmetered fruit rot									Fruit set Blight and unmetered fruit rot								
from the beginning (Fruit Set) Up to Berry Growth(of ripening to full ripening)	1	4	5	3	6	9	3	7	11	2	5	8	7	9	12	13	19	20
General Control	29	37	38	29	37	38	29	37	38	42	48	53	42	48	53	42	48	53
Diseases	Fruit rot at harvest time									Fruit rot at harvest time								
- from full ripening to Harvest (Berry Growth Up to Harvest)	11	16	19	13	18	20	17	20	25	15	18	21	21	28	33	27	34	40
General Control	33	38	40	33	38	40	33	38	40	45	50	58	45	50	58	45	50	58

Table (6): Effect of three Proposed chemical control programs (PCp), as well as, Farm chemical program (Fcp), mango modified chemical 1 program(MPc1 on isolation % of causal fungal pathogenic three grape varieties (Film ,Superior and Thomson) diseases(Di- back ,leave spots follower blight and fruit rot), under specific grape excremental farm at Noubria region condition , season (2022).

Stage	Associated Diseases	Frequency of isolation %(control Treatment)			Proposed chemical control programs (PCp)			Mango modified chemical 1 program(MPc1			Farm chemical program (Fcp		
		Frequency of isolation 2022%			Frequency of isolation 2022%			Frequency of isolation 2022%			Frequency of isolation 2022		
		Film	Superior	Thomson	Film	Superior	Thomson	Film	Superior	Thomson	Film	Superior	Thomson
Started bud break (0.0 Time)	Di- back Alternaria	18	21	24	7	10	13	10	12	16	14	17	20
	Phomopsis	6	10	16	2	5	9	3	5	10	4	7	12
	Botrytis	12	15	18	5	6	11	7	7	13	9	9	13
	Botrydipodia	5	8	11	2	3	6	2	4	7	3	5	9
	Others(cercospora , fuarium , Aspergillus niger and Pencillum)	3	5	5	0	1	3	1	2	4	1	3	3
		2	6	8	1	2	2	1	3	3	1	4	5
		2	2	3	00	00	00	00	00	1	1	1	1
		2	3	4	00	00	00	0	1	2	0	2	3
Leaves spots													
Budding (Budburst) to leave development and Shoot Growth	Alternaria	12	18	20	4	6	9	7	8	11	9	11	11
	Phomopsis	9	12	16	4	5	8	6	8	9	5	8	10
	Botrytis	16	19	21	5	7	12	6	8	11	10	12	16
	cercospora	5	8	11	1	3	6	2	5	6	4	6	9
	others	13	18	22	4	9	14	8	10	16			
Twig blight													
From budding to flowering (Flower Cluster Initiation)	Alternaria	18	22	25	4	8	10	6	9	13	9	14	17
	Botrytis	21	25	29	5	8	7	8	11	11	9	11	16
	cercospora	1	3	4	0	0	0	0	0	0	0	1	1
	Others(Fusarium Pencilum)	11	15	18	1	3	7	1	3	8	4	7	11
		0	1	4	0	0	0	0	0	0	0	0	1
Flower blight													
Flower and fruiting set to the growth of clusters	Alternaria	22	28	30	7	11	15	10	14	18	10	17	21
	Botrytis	13	16	21	4	5	8	4	9	11	7	12	15
	Phomopsis	11	17	24	2	3	5	3	5	10	6	8	16
	Others Aspergillus	16	22	23	2	7	12	5	8	12	7	13	15
	Pencilium	1	2	5	00	00	00	00	00	0	0	1	2
	Cercospora	2	5	6	00	00	0	00	00	0	1	1	3
From the beginning (Fruit Set) Up to Berry Growth(of ripening to full ripening) From full ripening to Harvest (Berry Growth Up to Harvest)	Fruit set –fruit rot(Unmetered)												
	Botrytis	6	9	10	1	3	5	1	5	7	3	6	8
	Alternaria	26	30	35	5	9	9	9	12	16	11	16	18
	Phomopsis	2	5	6	00	0	0	00	0	1	0	1	4
	Aspergillus	0	1	2	00	00	00	00	00	00	0	0	0
	Pencilium	0	0	0	00	00	00	00	00	00	00	00	00
	Cercospora	0	0	0	00	00	00	00	00	00	00	00	00
	Fruit rot at harvest time												
	Botrytis	44	50	57	14	22	30	19	26	33	25	31	39
	Alternaria	15	19	20	4	6	8	6	9	9	11	13	15
	Phomopsis Aspergillus	1	1	3	0	0	0	0	0	00	00		1
	Pencilium	20	25	30	2	5	6	7	8	11	16	18	22
		1	4	8	00	00	00	00	00	1	00	00	2

Table (8): Applying three control programs and their effect on **Botrytis blight disease Incidence %** on three grape varieties during two seasons. (2023and 2024)

Treatments	stage of grape growth	Botrytis blight_disease Incidence %					
		Film		Superior		Thomson	
		2 rd season	3 th season	2 rd season	3 th season	2 rd season	3 th season
Frist symptoms of Botrytis blight appeared on leave at 6/2 as few spots that showed at Modified program1(Mop1) , original farm program(Fp) and general control							
Pp	Frist leave of <i>Botrytis</i> blight	0	0	0	0	0	0
Mo p l		1	0	2	1	1	1
F p	.Shoot Growth	2	1	3	1	3	2
Control		7	10	8	10	10	15
P p	.Shoot Growth Up to Stage19	0	0	0	0	0	0
Mo pl		0	0	0	0	0	0
Fp		0	0	0	0	0	0
Control		10	15	10	10	15	20
Pp (P ph)		0	0	0	0	0	0
Mo p l	Shoot Growth Up to Flower Cluster Initiation	0	0	0	0	0	0
Fp		3	1	5	2	5	3
Control		12	20	15	18	18	20
Pp	Flower cluster initiation Up to Flower	2	0	3	0	5	3
Mop l		5	1	5	2	5	2
Fp		8	6	18	15	20	15
Control		18	26	30	25	28	30
Pp	Flower blight	5	1	10	5	8	5
Pp	Flowering and Fruit set	3	0	5	1	5	3
Mo p l		5	1	5	2	8	5
Fp		10	7	15	9	15	10
Control		19	22	28	23	28	30
Pp		Fruit gray rot	1	1	3	0	0
Mo pl	3		1	5	0	0	1
Fp	10		7	10	9	10	15
Control	30		35	35	33	35	35

Table (9): Applying three control programs and their effect on Downy mildew_disease severity_%on three grape varieties during two seasons. (2023 and 2024)

Treatments	Date Of application	Downy mildew_disease severity % <u>On leaves</u>					
		Film		Superior		Thompsons	
		5 rd season	6 th season	5 rd season	6 th season	5 rd season	6 th season
<u>Frist symptoms of Downy mildew appeared on leave at 11/3 as few spots that showed at Modified program1(Mop1) , original farm program(Fp) and general control</u>							
Pp (manco+meta)	Flower Cluster Initiation Up to Flower	0	0	0	0	0	0
Mop 1 (Amis-top)		3	1	5	2	1	3
Fp (amis- top)		5	20	30	3	10	20
CONTROL	Without treatments	20	33	38	20	40	45
Pp (be)	22/ Mar: 2/Apr. Conducting the process of folding grape leaves	0	0	0	0	0	0
M p 1	Flowering and Fruit Set	5	7	10	2	3	9
Fp		5	7	15	3	4	11
CONTROL	Without treatments	30	40	40	35	50	50
Pp (Ho)		0	0	0	0	0	0
Mo p 1		0	0	0	0	0	0
Fp		5	6	17	3	15	10
CONTROL	Without treatments	33	50	50	39	56	60