STM JOURNALS

Research & Reviews: Journal of
Agricultural Science and Technology
https://journals.stmjournals.com/rrjoast

ISSN: 2278-2206 (Online)
ISSN: 2349-3682 (Print)
Volume 14, Issue 3, 2025
September–December
DOI (Journal): 10.37591/RRJoAST

Research RRJoAST

Efficacy of New Fungicides in Controlling Powdery Mildew of Sweet Gourd

H. Rahman[1], A. Akter[1,*], M.M. Rahman[2], M.M. Islam[3]

Abstract

This experiment was conducted at the Plant Pathology Division, Regional Agricultural Research Station (RARS), Jamalpur, Bangladesh during 2025 of Rabi & Kharif-1 seasons to find out the effectiveness of new fungicides against Powdery mildew disease of sweet gourd. Twenty (20) new fungicides viz. Acrozet 50 WP, Qingdao GBW, Hea 10 FC, Top star 32.5 SC, Nila 80 WP, Soazeb 72 WP, Safezeb 80 WP, Canvas 32.5 SC, Pyzim 50 WP, Binzole 80 WP, Lilizole 5 EC, Promozole 32.5% SC, Biltu 80 WP, Rainbin 32.5 SC, Rabizol 80 WP, Experts sina Plus 32.5 SC, Release 28 SC, A Top 32.5 SC, Agrovit Gold 80 WDG, Sk Zim 50 WP along with standard control (Thiovit 80 WG) and control were evaluated in this study. BARI Mistikumra-2 was used as a test variety. All fungicides improved yield contributing characters and fruit yield of sweet gourd in general. Among the fungicides, the lowest disease incidence (7.69%) was observed in T_{19} treatment fungicide (Agrovit Gold 80 WDG) whereas the highest disease incidence (52.50%) was recorded in the control treated plot. Among the fungicides, the lowest disease severity (1.08%) was recorded in T_9 treatment fungicide followed by T_{19} (1.25%), T_6, T_8, T_{20} (1.50%), standard control (Thiovit 80 WG) (1.83%) and T_{10} (1.92%) treatments fungicides, respectively. On the other hand, the highest disease severity (15.63%) was found in the control treated plot. The highest efficacy of new fungicides (93.35%) of disease severity over control was found in T_9 encoded fungicide followed by T_{19} (92.00%), T_6 (90.68%), T_8 (90.66%) and T_{20} (90.33%) treatments fungicides treated plot, respectively and the lowest (75.34%) in T_5 treatment fungicide treated plot. The highest yield (36.00 t/ha) was recorded in T_{19} treatment fungicide (Agrovit Gold 80 WDG) treated plot followed by T_{13} (31.98 t/ha) and T_{18} (31.36 t/ha) encoded fungicide treated plot, respectively and the lowest (9.13 t/ha) in the control treated plot. According to the evaluation, applying the fungicide Agrovit Gold 80 WDG could be a promising strategy to control sweet gourd powdery mildew disease in the field.

Keywords: Disease incidence, disease severity, efficacy of new fungicides, fruit yield (t/ha), powdery mildew, sweet gourd

***Author for Correspondence**
A. Akter
E-mail: aakterbari@yahoo.com

[1]Senior Scientific Officer, Horticulture Research Centre (HRC), Regional Agricultural Research Station (RARS), Bangladesh Agricultural Research Institute (BARI), Jamalpur, Bangladesh
[2]Principal Scientific Officer, Plant Pathology Division, Regional Agricultural Research Station (RARS), Bangladesh Agricultural Research Institute (BARI), Jamalpur, Bangladesh
[3]Principal Scientific Officer, Plant Pathology Division, Bangladesh Agricultural Research Institute (BARI), Joydebpur, Gazipur, Bangladesh

Received Date: October 28, 2025
Accepted Date: November 24, 2025
Published Date: December 20, 2025

Citation: H. Rahman, A. Akter, M.M. Rahman, M.M. Islam. Efficacy of New Fungicides in Controlling Powdery Mildew of Sweet Gourd. Research & Reviews: Journal of Agricultural Science and Technology. 2025; 14(3): 134–142p.

INTRODUCTION

A popular vegetable in Bangladesh is the sweet gourd (*Cucurbita maxima*), a member of the Cucurbitaceae family [1]. It is originated in Central America, was domesticated in Mexico, and is today found all over the world [2]. According to Aziz *et al.* (2023) [3], it is a valuable source of functional components, primarily carbohydrates, vitamins A, C, and E, as well as a variety of minerals that operate as antioxidants in human nutrition. Oil and unsaturated fatty acids abound in sweet gourd seeds [1]. The crop is grown on about 75000 acres in Bangladesh, yielding about 416304 metric tons [4]. Because of diseases, sweet gourd production has dramatically decreased in today's world. There are several diseases that can cause yield reduction of sweet gourd such as bacterial wilt, angular leaf spot, phytophthora blight, downy mildew, powdery mildew, etc. Among the diseases, powdery mildew ranked at the top. This disease affects all cucurbits [5]. This disease is caused by two fungal species viz. *Podosphaera xanthii* and *Erysiphe cichoracearum* [6, 7]. In Bangladesh, the fungus *Erysiphe cichoracearum* (Perfect stage-*Oidium spp.*) causes most of the powdery mildew on cucurbits [8]. Powdery Mildew (PM), a fungal disease caused by *Erysiphe cichocearum*, is considered a threat for yield reducing factor of the crop [9-11]. The primary symptoms are white, powder-like spots on the leaves and stems. Powdery mildew appears on leaves, petioles and young stems as a white powdery mass composed of mycelium and numerous spores [5, 12]. Under favourable environmental conditions, the entire upper surface of the leaf may be covered with the powdery fungus and the whole field may appear to be white within a few days [6, 13]. The resulting decrease in photosynthesis may cause significant reductions in the quality and yield of fruit and yield loss exceeding 30 to 34% in the crop [14, 15]. The disease is most damaging if it appears three to four weeks before harvest [16].

In the commercial sector, powdery mildew is commonly managed using various synthetic fungicides and/or breeding methods that create cultivars with resistance. Many agricultural experts advised implementing a rotation of fungicides from different classes on a 7-10-day spray schedule once a disease has been detected [17]. The reason why contact fungicides are effective in controlling powdery mildew is because most plant infections occur on the surface of leaves, requiring thorough coverage for successful treatment. So, fungicide significantly reduces the powdery mildew disease incidence [18]. Repeated use of systemic chemicals builds up resistance in pathogens against fungicides [19]. Mixing curative and preventive fungicides is the best tactic to get rid of fungicidal resistance [20]. Despite the fungicide usage, it is an effective strategy to control plant diseases [21] but continuous use may deteriorate the environment. Limited reports on the chemical control of sweet gourd powdery mildew disease are available in Bangladesh. Therefore, the study was carried out to determine the effectiveness of some new fungicides against powdery mildew disease of sweet gourd.

MATERIALS AND METHODS

This experiment was conducted in the field of the Plant Pathology Division, Regional Agricultural Research Station (RARS), Bangladesh Agricultural Research Institute (BARl), Jamalpur, Bangladesh during the Rabi & Kharif-1 seasons of 2025. The texture of the experimental field soil was loamy. The experiment was laid out in a Randomized Complete Block Design (RCBD) with twenty-two treatments, and each treatment was replicated three times. The following treatments were used in this experiment (Table 1). BARI Mistikumra-2 was used as a variety.

The experimental field was well prepared by ploughing and laddering. The unit plot size was 4.0 m × 2.0 m maintaining 2.0 m × 2.0 m plant spacing. Each pit size was 50×50×45 cm. The manures and chemical fertilizers were used as nutrient sources for soil as recommended by Fertilizer Recommendation Guide (FRG)-2024. Three seeds of sweet gourd were sown in each pit on 10 February 2025 and after germination one healthy seedling was allowed to grow in each plot. Weeding, irrigation and intercultural operations were done as per recommendations. The insecticide Malathion 57 EC was applied three times at 10-day intervals to control red pumpkin beetle insects. Sex pheromone trap was used to control Fruit fly infestation. For controlling stem and fruit rot disease, we sprayed Ridomil Gold MZ 68 WG. We sprayed imidacloprid group insecticides to control the vector insects and prevent the viral infection.

Three sprays were done at 10 days interval after first appearance of the disease symptom. Data were recorded on percentage of disease incidence, percentage of disease severity, determination of disease severity (0-4 scale), percentage of efficacy of fungicides, number of fruits per plant, number of rotted fruits per plant, individual fruit weight, fruit yield per plot, and fruit yield data were converted into per hectare yield (ton). The disease incidence was calculated using the following formula.

Table 1. The name of fungicides with their group name and doses.

Treatments and names of fungicides	Group name of fungicides with a.i.	Doses
T_1= Acrozet 50 WP	Carbendazim 50%	2.0 gm/L of water
T_2= Qingdao GBW	(*Bacillus subtilis*) 3x10 cfu/g WP	0.7 gm/L of water
T_3= Hea 10 FC	Hexaconazole 10%	1.0 ml/ L of water
T_4= Top star 32.5 SC	Azoxystrobin 20% + Difenoconazole 12.5%	0.5 ml/L of water
T_5= Nila 80 WP	Mancozeb 80% WP	2.0 gm/ L of water
T_6= Soazeb 72 WP	Metalaxyl + Mancozeb 72% w/w	5.0 gm/ L of water
T_7= Safezeb 80 WP	Mancozeb 80% w/w	2.0 gm/ L of water
T_8= Canvas 32.5 SC	Azoxystrobin 20% + Difenconazole 12.5%	0.5 ml/L of water
T_9= Pyzim 50 WP	Carbendazim 50%	1.0 gm/L of water
T_{10}= Binzole 80 WP	Tricyclazole 60%+ Biserethiazole 20% WP	0.6 gm/ L of water
T_{11}= Lilizole 5 EC	Hexaconazole 5% EC	1.0 ml/ L of water
T_{12}= Promozole 32.5 SC	Azosystrobin 20%+Difenoconazole 12.5% SC	1.0 gm/ L of water
T_{13}= Biltu 80 WP	Trycyclazole + Bismerthiazole	0.6 gm/ L of water
T_{14}= Rainbin 32.5 SC	Azoxystrobin + Difenoconazole	1.0 ml/L of water
T_{15}= Rabizol 80 WP	Tricyclazole 60%+ Bismerthiazole 20%	0.6 gm/ L of water
T_{16}= Experts sina Plus 32.5 SC	Azoxystrobin 20%+Difenoconazole 12.5% w/w	1.0 ml/ L of water
T_{17}= Release 28 SC	Azoxystrobin 20% + Cyproconazole 8% SC	1.0 ml/L of water
T_{18}= A Top 32.5 SC	Azoxystrobin 20%+Difenoconazole 12.5% w/w	1.0 ml/ L of water
T_{19}= Agrovit Gold 80 WDG	Sulphur 80% WDG	2.0 gm/ L of water
T_{20}= Sk Zim 50 WP	Carbendazim 50% WP	2.0 gm/ L of water
T_{21}= Thiovit 80 WG	Thiovit 80 WG	2.0 gm/ L of water
T_{22}= Control	Only water spray	-

$$\text{Disease incidence (\%)} = \frac{No.of\ infected\ plants}{Total\ no.of\ plants} \text{x}100$$

The data on diseases severity of Powdery mildew was rated following 0-4 rating scale [22] where, 0= no disease symptom, 1= tiny white or dirty gray spots on leaves, stem free from powdery mass, 2= several spots on leaves, few spot coalesce to form large spot having superficial powdery mass, stem also infected, 3= several large powdery spots on leaves, more than 50% leaves infected, infection also occur on green stem, 4=all leaves as well as stem and other part coated with superficial thick powdery mass, leaf colour changes to grayish and start drying.

Data on yield contributing characters were recorded during the fruit development stage and harvesting time. The percentage of efficacy of each fungicide was calculated. Data was analyzed statistically through 'R' software program [23]. The significant differences in the treatment means were compared by Duncan's Multiple Range Test (DMRT) at 5% level. The correlation between yield contributing characters of crops and fruit yield parameters with disease severity (%) were also computed.

RESULTS AND DISCUSSION

The effect of new fungicides on powdery mildew disease and yield contributing characters of sweet gourd was significantly different except individual fruit weight are presented in Table 1.

Disease Incidence (%)

The effect of new fungicides on the percent disease incidence of Powdery mildew of sweet gourd was evaluated at 110 days after sowing (DAS). Among the new fungicides, the lowest disease incidence (7.69%) was observed in T_{19} treatment which was statistically similar to T_6 (7.88%) and T_9 (7.88%) treated plots, respectively, whereas the highest disease incidence (52.50%) was recorded in control (only water spray) treated plot (T_{22}). So, the new fungicide Agrovit Gold 80 WDG showed highest potential to suppress the powdery mildew disease of sweet gourd.

Disease Severity (%)

Among the new fungicides, the lowest disease severity (1.08%) was recorded in T_9 treatment followed by T_{19} (1.25%), T_6, T_8, T_{20} (1.50%), standard control (Thiovit 80 WG) (1.83%) and T_{10} (1.92%) treatments which were statistically similar, respectively. On the other hand, the highest disease severity (15.63%) was found in the control treated plot. So, the fungicide Pyzim 50 WP and Agrovit Gold 80 WDG showed highest possibility to control the powdery mildew disease of sweet gourd.

Efficacy of Fungicides (%)

The highest efficacy of new fungicides (93.35%) of disease severity over control was found in T_9 treatment followed by T_{19} (92.00%), T_6 (90.68%), T_8 (90.66%) and T_{20} (90.33%) treatments fungicides treated plots which were statistically similar, respectively and the lowest (75.34%) in T_5 treatment fungicide treated plot. So, the fungicides Pyzim 50 WP, Agrovit Gold 80 WDG, Soazeb 72 WP, Canvas 32.5 SC, and Sk Zim 50 WP showed highest possibility to control the powdery mildew disease of sweet gourd.

Number of Fruits Per Plant

The highest number of fruits per plant (8.00) was recorded in T_{19} encoded fungicide followed by T_{13} (7.00), T_5, T_6, T_9, T_{10}, T_{17}, T_{18} and standard control (Thiovit 80 WG) (6.00) which were statistically similar, respectively and the lowest (3.00) in the control treated plot. Based on the findings, it could be figured out that Agrovit Gold 80 WDG played an imperative role in controlling powdery mildew disease of sweet gourd.

Number of Rotted Fruits Per Plant

The number of rotted fruits per plant varied from 0 to 2.00 among the new fungicides treated plots. Two rotted fruits per plant were noticed in 7 treatments, one in 12 treatments and zero in 3 treatments. From the findings it is clear that there is a positive correlation between fruit rot and disease severity of sweet gourd. While powdery mildew does not directly cause fruit rot, it significantly weakens the sweet gourd plant, making the fruit more susceptible to rot and other opportunistic diseases. The relationship is indirect, but a severe powdery mildew infection can lead to poor fruit quality and premature decay. In short, powdery mildew creates a compromised growing environment and a weaker, less-resilient plant. This makes the sweet gourd fruit more susceptible to other, distinct pathogens that are the direct cause of fruit rot. Controlling powdery mildew is therefore a key part of an overall strategy to prevent fruit rot and protect sweet gourd yields.

Individual Fruit Weight

Individual fruit weight did not differ statistically due to the use of same variety such as BARI Mistikumra-2. However, individual fruit weight varied from 1.22 to 2.07 kg among the treatments.

Fruit Yield Per Plot (kg)

The highest fruit yield (28.80 kg/plot) was recorded in T_{19} fungicide treated plot followed by T_{13} (25.59 kg/plot) and T_{18} (25.08 kg/plot) fungicides treated plots which were statistically similar, respectively and the lowest (7.30 kg/plot) in the control treated plot. The findings of the study indicated that the sweet gourd fruit yield per plot varied among the treatments in the field conditions and Agrovit Gold 80 WDG demonstrated the best performance in controlling powdery mildew disease and increasing crop yield.

Fruit Yield Per Hectare (Tons)

The highest fruit yield (36.00 t/ha) was recorded in T_{19} fungicide treated plot followed by T_{13} (31.98 t/ha) and T_{18} (31.36 t/ha) fungicide treated plots which were statistically similar, respectively and the lowest (9.13 t/ha) in the control treated plot.

The results of the study showed that there existed a substantial negative & positive correlation between the severity of powdery mildew disease and yield contributing characters and fruit yield of sweet gourd (Figure 1). Significant negative correlations were found to exist between the powdery mildew disease severity with number of fruits per plant (y = -0.2036x + 5.7609), individual fruit weight (y = -0.2036x + 5.7609), fruit yield per plot (y = -0.2036x + 5.7609) and fruit yield per hectare (y = -0.2036x + 5.7609). On the other hand, significant positive correlations were found to exist between the powdery mildew disease severity with number of rotted fruits per plant (y = 0.0653x + 0.9816). The findings validated that the application of chemical fungicides would reduce the severity of powdery mildew disease and thereby enhanced yield contributing characters as well as the fruit yield of sweet gourd.

The impact of various new fungicides was imperative on severity of powdery mildew disease, fruit yield, and yield components of sweet gourd (Table 1). The outcomes demonstrated the significant effectiveness of all new fungicides, viz. Acrozet 50 WP, Qingdao GBW, Hea 10 FC, Top star 32.5 SC, Nila 80 WP, Soazeb 72 WP, Safezeb 80 WP, Canvas 32.5 SC, Pyzim 50 WP, Binzole 80 WP, Lilizole 5 EC, Promozole 32.5% SC, Biltu 80 WP, Rainbin 32.5 SC, Rabizol 80 WP, Experts sina Plus 32.5 SC, Release 28 SC, A Top 32.5 SC, Agrovit Gold 80 WDG, Sk Zim 50 WP and standard control (Thiovit 80 WG) against powdery mildew disease of sweet gourd. Assessment of the percent disease incidence, percent disease severity, percentage of efficacy of new fungicides, number of fruits per plant, number of rotted fruits per plant, fruit yield per plot (kg), and fruit yield per hectare (tons) in various chemical fungicides treatments revealed compelling results. Due to new fungicide treatments the severity of powdery mildew disease of sweet gourd was ranged from 1.08 to 15.63%. The findings were aligned with McGrath *et al.* (2015) [24], who reported that chemical fungicides showed a significant reduction in controlling powdery mildew disease of sweet gourd. The percentage of efficacy of new fungicides over control ranged from 75.34% to 93.35%. The lowest efficacy of fungicides was recorded from T_5 treatment, and the highest efficacy of fungicides was obtained from T_9 over the control treatment. These findings are aligned with previous studies reported by Jones (1978) [25]. Matheron and Porchas (2008) [21] found that fungicide treatments of melon varieties reduced the percentage of diseases of powdery mildew compared to untreated control.

The effect on fruit yield and yield contributing characters of sweet gourd under set treatments were enhanced by the application of different new fungicides. Furthermore, similar findings were reported by Bhaskar *et al.* (2012) [26] in groundnut, Meena *et al.* (2016) [27] in green gram, Abhishek and Sobita (2017) [28] in garden pea, Madhuri and Sagar (2020) in black gram, Jayasekhar and Ebenazar (2016) and Rhouma *et al.* (2023) [5] in melon. The correlation study showed a substantial negative & positive relation between yield contributing characters and fruit yield of sweet gourd with powdery mildew severity.

Table 2. Effect of different fungicides to control powdery mildew disease of sweet gourd at RARS, BARI, Jamalpur, Bangladesh during Rabi & Karif-1 seasons of 2025.

Treatments	Disease incidence (%)	Disease severity (%)	Disease severity (0-4 scale)	Efficacy of new fungicides (%)	No. of fruits/plant
T_1= Acrozet 50 WP	16.63 bc	2.42 bcde	1	84.82 abc	4.00 cd
T_2= Qingdao GBW	20.50 bc	3.42 bcd	1	79.15 bc	4.00 cd
T_3= Hea 10 FC	14.13 bc	2.75 bcde	1	82.23 abc	5.00 bcd
T_4= Top star 32.5 SC	22.13 bc	2.92 bcde	1	81.74 abc	5.00 bcd
T_5= Nila 80 WP	31.38 b	3.92 b	1	75.34 c	6.00 bc
T_6= Soazeb 72 WP	7.88 c	1.50 cde	1	90.68 ab	6.00 bc
T_7= Safezeb 80 WP	19.38 bc	2.00 bcde	1	87.71 abc	4.00 cd
T_8= Canvas 32.5 SC	16.50 bc	1.50 cde	1	90.66 ab	5.00 bcd
T_9= Pyzim 50 WP	7.88 c	1.08 e	1	93.35 a	6.00 bc
T_{10}= Binzole 80 WP	10.25 bc	1.92 bcde	1	87.85 abc	6.00 bc

Treatments	Disease incidence (%)	Disease severity (%)	Disease severity (0-4 scale)	Efficacy of new fungicides (%)	No. of fruits/plant
T_{11}= Lilizole 5 EC	12.38 bc	3.42 bcd	1	78.81 bc	5.00 bcd
T_{12}= Promozole 32.5 SC	29.38 bc	2.67 bcde	1	83.41 abc	4.00 cd
T_{13}= Biltu 80 WP	29.81 bc	2.71 bcde	1	83.24 abc	7.00 ab
T_{14}= Rainbin 32.5 SC	20.44 bc	3.63 bc	1	76.71 c	4.00 cd
T_{15}= Rabizol 80 WP	20.06 bc	3.13 bcde	1	79.69 bc	4.00 cd
T_{16}=Experts sina Plus 32.5 SC	28.75 bc	3.25 bcde	1	79.02 bc	4.00 cd
T_{17}= Release 28 SC	16.13 bc	2.38 bcde	1	84.62 abc	6.00 bc
T_{18}= A Top 32.5 SC	14.25 bc	2.71 bcde	1	83.24 abc	6.00 bc
T_{19}= Agrovit Gold 80 WDG	7.69 c	1.25 de	1	92.00 ab	8.00 a
T_{20}= Sk Zim 50 WP	9.00 bc	1.50 cde	1	90.33 ab	6.00 bc
T_{21}= Thiovit 80 WG	10.00 bc	1.83 bcde	1	88.23 abc	6.00 bc
T_{22}= Control	52.50 a	15.63 a	2	0.00 d	3.00 d
LS	**	**	-	**	**
CV (%)	60.62	35.09	-	8.45	22.24

Treatments	No. of rotted fruits/plant	Individual fruit weight (kg)	Fruit yield/plot (kg)	Fruit Yield (t/ha)
T_1= Acrozet 50 WP	2.00 a	1.92	15.39 c-h	19.24 c-h
T_2= Qingdao GBW	2.00 a	1.93	14.83 d-h	18.54 d-h
T_3= Hea 10 FC	1.00 b	1.84	17.72 b-g	22.15 b-g
T_4= Top star 32.5 SC	1.00 b	1.94	18.10 b-g	22.62 b-g
T_5= Nila 80 WP	1.00 b	1.71	20.46 a-g	25.57 a-g
T_6= Soazeb 72 WP	2.00 a	1.99	23.90 abcd	29.88 abcd
T_7= Safezeb 80 WP	0.00 c	1.95	15.61 c-h	19.51 c-h
T_8= Canvas 32.5 SC	1.00 b	1.85	18.33 b-g	22.91 b-g
T_9= Pyzim 50 WP	0.00 c	1.94	23.23 a-f	29.04 a-f
T_{10}= Binzole 80 WP	1.00 b	1.76	21.47 a-g	26.84 a-g
T_{11}= Lilizole 5 EC	1.00 b	1.92	19.28 a-g	24.10 a-g
T_{12}= Promozole 32.5 SC	1.00 b	1.63	13.45 fgh	16.81 fgh
T_{13}= Biltu 80 WP	1.00 b	1.83	25.59 ab	31.98 ab
T_{14}= Rainbin 32.5 SC	1.00 b	1.75	14.00 efgh	17.50 efgh
T_{15}= Rabizol 80 WP	0.00 c	1.58	12.67 gh	15.84 gh
T_{16}=Experts sina Plus 32.5 SC	2.00 a	1.88	15.36 c-h	19.20 c-h
T_{17}= Release 28 SC	1.00 b	1.63	19.52 a-g	24.41 a-g
T_{18}= A Top 32.5 SC	2.00 a	2.07	25.08 abc	31.36 abc
T_{19}= Agrovit Gold 80 WDG	2.00 a	1.78	28.80 a	36.00 a
T_{20}= Sk Zim 50 WP	1.00 b	1.92	23.04 a-e	28.80 a-e
T_{21}= Thiovit 80 WG	1.00 b	2.00	23.62 a-e	29.53 a-e
T_{22}= Control	2.00 a	1.22	7.30 h	9.13 h
LS	**	NS	**	**
CV (%)	39.22	18.81	26.84	26.84

*LS means level of significance; ** denotes significant at 1% level of significance; same letter does not differ significantly at the same column.*

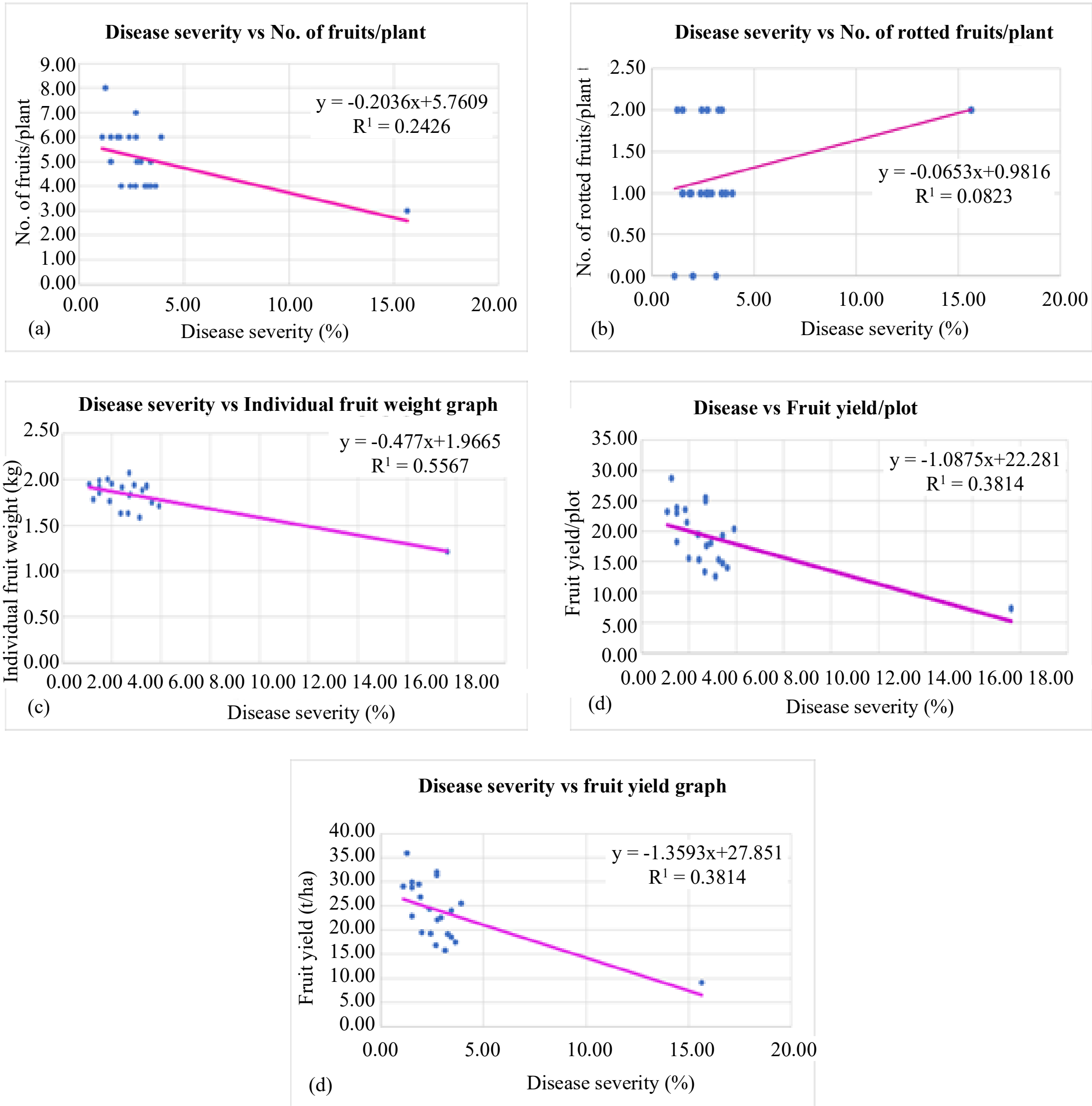

Figure 1. Correlation between yield contributing characters and fruit yield of sweet gourd with powdery mildew disease severity (%) (a–e).

CONCLUSION

Among twenty (20) new fungicides, fourteen (Acrozet 50 WP, Hea 10 FC, Top star 32.5 SC, Soazeb 72 WP, Safezeb 80 WP, Canvas 32.5 SC, Pyzim 50 WP, Binzole 80 WP, Promozole 32.5% SC, Biltu 80 WP, Release 28 SC, A Top 32.5 SC, Agrovit Gold 80 WDG and Sk Zim 50 WP) suppressed the disease more than 80%. Also, standard control (Thiovit 80 WG) suppressed the disease more than 80%. Moreover, seven (7) new fungicides (Soazeb 72 WP, Canvas 32.5 SC, Pyzim 50 WP, Biltu 80 WP, A Top 32.5 SC, Agrovit Gold 80 WDG and Sk Zim 50 WP) performed better against powdery mildew disease in considering disease incidence, disease severity and fruit yield of sweet gourd. The experiment's results showed that applying Agrovit Gold 80 WDG @ 2.0 gm/L of water increased sweet gourd fruit yield and reduced powdery mildew disease severity. Thus, under field conditions, Agrovit Gold 80 WDG, a fungicide belonging to the sulfur group, was the more effective option for suppressing the powdery mildew disease of sweet gourd than other fungicides.

REFERENCES

1. Lisa SA, Kabir MA, Khan S. Utilization of seed from *Cucurbita maxima*, a pumpkin variety of Bangladesh, converting into refined oil and oilcake. *Discover Food*. 2022;2(1):19. https://doi.org/10.1007/s44187-022-00021-9

2. Ahmad G, Khan AA. Pumpkin: horticultural importance and its roles in various forms; a review. *Int J Horti Agri*. 2019;4(1):1–6. http://dx.doi.org/10.15226/2572-3154/4/1/00124
3. Aziz A, Noreen S, Khalid W, Ejaz A, Rasool IFU, Munir AM, *et al*. Pumpkin and pumpkin byproducts: phytochemical constituents, food application and health benefits. *ACS Omega*. 2023;8(26):23346–23357. https://doi.org/10.1021/acsomega.3c02176
4. Bangladesh Bureau of Statistics (BBS). Yearbook of Agricultural Statistics of Bangladesh, 2024. Dhaka: Statistics and Informatics Division, Ministry of Planning; 2025.
5. Rhouma A, Mehaoua MS, Mougou I, Rhouma H, Shah KK, Bedjaoui H. Combining melon varieties with chemical fungicides for integrated powdery mildew control in Tunisia. *Eur J Plant Pathol*. 2023;165(1):189–201.
6. Cohen R, Burger Y, Katzir N. Monitoring physiological races of *Podosphaera xanthii*, the causal agent of powdery mildew in cucurbits: factors affecting race identification and the importance for research and commerce. *Phytoparasitica. 2*004;32:174–183.
7. Perez-Garcia A, Romero D, Fernandez-Ortuno D, Lopez-Ruiz F, de Vicente A, Tores JA. The powdery mildew fungus *Podosphaera fusca* (syn. *Podosphaera xanthii*), a constant threat to cucurbits. *Mol Plant Pathol.* 2009;10(2):153–160. https://doi.org/10.1111/j.1364-3703.2008.00527.x
8. Yasmin L, Afroz M, Nahar MS, Rahman MA, Khanam NN. Management of powdery mildew in sweet gourd (*Cucurbita moschata*). Int J Sustain *Crop Prod*. 2008;3(6):21–25.
9. Talukdar MJ. Plant diseases in Bangladesh. Bangladesh J Agric Res. 1974;1(1):61–86.
10. Singh RS. Diseases of vegetable crops. Calcutta: Oxford & IBH Publishing Co.; 1985. p. 175–176.
11. Agrios GN. Plant pathology. 4th ed. London: Academic Press; 1997. p. 308.
12. Glawe DA. The powdery mildews: a review of the world's most familiar (yet poorly known) plant pathogens. Annu Rev Phytopathol. 2008;46:27–51. https://doi.org/10.1146/annurev.phyto.46.081407.104740
13. Rhouma A, Bedjaoui H, Khrieba MI, Mehaoua MS. Technical document on powdery mildew of cucurbits. J Global Agric Ecol. 2021;11:1–6. https://www.ikprress.org/index.php/JOGAE/article/view/6715
14. Keinath AP, DuBose VB. Evaluation of fungicides for prevention and management of powdery mildew on watermelon. Crop Prot. 2004;23(1):35–42. https://doi.org/10.1016/S0261-2194(03)00165-0
15. Tisserat N. Powdery mildew of pumpkin. Extension Bulletin. Kansas State University, Department of Plant Pathology; 2006.
16. Smith J. Pathological report of powdery mildew of pumpkin. Kansas State University, Department of Plant Pathology; 2006.
17. Horsfield A, Wicks T, Davies K, Wilson D, Paton S. Effect of fungicide use strategies on the control of early blight (*Alternaria solani*) and potato yield. *Australas Plant Pathol.* 2010;39(4):368. https://doi.org/10.1071/AP09090
18. Maryam Y, Romana A, Nadeem A, Zeshan MA, Safdar A, Ghani MU. Evaluation of fungicides and nutritional amendments against powdery mildew of pumpkin. *Asian J Agric Biol*. 2020;8:69–74.
19. Gullino ML, Leroux P, Smith CM. Uses and challenges of novel compounds for plant disease control. *Crop Prot.* 2000;19(1):1–11. https://doi.org/10.1016/S0261-2194(99)00095-2
20. Van den Bosch F, Paveley N, van den Berg F, Hobbelen P, Oliver R. Mixtures as a fungicide resistance management tactic. Phytopathology. 2014;104(12):1264–1273. https://doi.org/10.1094/PHYTO-04-14-0121-RVW
21. Matheron ME, Porchas M. Examination of fungicides for management of powdery mildew on cantaloupe in 2007. Vegetable Report. Tucson (AZ): University of Arizona, College of Agriculture and Life Sciences; 2008.
22. Husain SI, Akram M. A preliminary screening of pot marigold cultivars for resistance to powdery mildew. *Indian Phytopathol.* 1999;52(1):90–91.
23. R Core Team. R: A language and environment for statistical computing. Vienna: R Foundation for Statistical Computing; 2024. https://www.R-project.org/

24. McGrath TM, LaMarsh K. Efficacy of fungicides for managing powdery mildew in pumpkin–2014. Midwest Vegetable Trial Reports. 2015;Paper 129. https://docs.lib.purdue.edu/mwvtr/129.
25. Jones JP. Disease thresholds for downy mildew and target leaf spot of cucurbits and late blight of tomato. *Plant Dis Rep.* 1978;62(7–12):798.
26. Bhaskar AV, Parakhia AM, Patel SV. Compatibility of fungicides and insecticides for management of groundnut tikka disease (early leaf spot and late leaf spot) in Saurashtra region. *Indian J Plant Prot.* 2012;40(3):191–194.
27. Meena NK, Zacharia S, Patil NB. Management of green gram powdery mildew (*Erysiphe polygoni* DC.) by foliar spray of fungicides and *Trichoderma* spp. *Ecol Environ Conserv.* 2016;22:251–255.
28. Abhishek S, Simon S. Eco-friendly management of powdery mildew and rust of garden pea (*Pisum sativum* L.). *J Pharm Phytochem*. 2017;6(5):90–93.